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ABSTRACT

Appropriate for any elementary, middle school, or high school teacher who uses reading as part of content instruction, this book describes Project CRISS (Content Reading Including Study Systems), developed in Kalispell, Montana, at School District No. 5, which focuses on teaching students how to learn through reading, with studying, and writing strategies incorporated with content instruction. Five principles are fundamental to the instructional components described in the book: incorporating practical and theoretical ideas about text organization; having students function as active learners; teaching students to use a variety of learning strategies and to monitor their own learning; considering writing as essential for content learning; and using direct instructional methods. Chapters in the book are: (1) Project CRISS; (2) Textbook Assessment; (3) Informal Assessment Procedures; (4) Generating Background Knowledge and Understanding Main Ideas; (5) Learning Guides and Writing Strategies; (6) Vocabulary; and (7) Directed Reading Thinking Activity (DRTA). Contains 34 references and a 60-item glossary. (RS)

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Content Reading Including Study Systems

Reading, Writing and Studying Across the Curriculum

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Content Reading Including Study Systems

Reading, Writing and Studying Across the Curriculum

School District No. 5, Kalispell Montana

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Contents

List of Exhibits ix

Chapter 1: Project CRISS 1

Text Organization 2
Background Knowledge and Active Learning 2
Active Learning Strategies and Self-Monitoring 2
Writing 2
Direct Instruction 3
The Implications of the CRISS Project 3

Chapter 2: Textbook Assessment 5

Part 1: Readability Formulas 5
Part 2: Qualities of a Well-Written Text 6
  Content Evaluation 6
  Organization within Chapters 6
  Sentence Structure 7
  Content Signals 7
    Exhibit 2.1: Signal Words 8
  Concept Development 9
  Vocabulary Density 9
  Contextual Clues 9
  Visual Information 10
Part 3: Textbook Assessment Checklists 10
  Exhibit 2.2: Science Content Area Text Assessment 11
  Exhibit 2.3: Social Studies Content Area Text Assessment 15
  Exhibit 2.4: Language Arts Content Area Text Assessment 20
  Exhibit 2.5: Mathematics Content Area Text Assessment 26
Part 4: Teaching Text Organization 30
  Strategies for Teaching Text Organization 30
    Direct Instruction 30
    Guided Practice 30
    Exhibit 2.6: Teacher Think-Alouds 32
  Student Guides to Text Organization 35
    Exhibit 2.7: Science Content Area Student Guide 36
    Exhibit 2.8: Social Studies Content Area Student Guide 38
    Exhibit 2.9: English Content Area Student Guide 40
    Exhibit 2.10: Mathematics Content Area Student Guide 42
Summary 44

Chapter 3: Informal Assessment Procedures 45

Part 1: Study Skills Inventory 45
  Exhibit 3.1: Study Skills Inventory 46
Part 2: Informal Learning Inventory 48
  Selecting the Reading Material 48
  Procedure 48
  Evaluation 48

Part 3: Cloze Assessments 49
  Passage Selection and Preparation 49
  Test Administration 50
  Test Scoring and Interpretation 50
    Exhibit 3.2: Sample Cloze Test 51
Summary 53

Chapter 4: Generating Background Knowledge and Understanding Main Ideas 55
Part 1: Background Knowledge 55
  Direct Instruction 55
  Guided Practice 56
    Exhibit 4.1: Sample Background Pre-Reading Guide 57
Part 2: Main Ideas 58
  Strategy 1: Teacher Think-Alouds 58
    Direct Instruction 58
    Guided Practice 59
  Strategy 2: Power Thinking 59
    Direct Instruction 59
    Guided Practice 60
  Strategy 3: Mystery Pot 60
    Direct Instruction 60
    Guided Practice 61
  Strategy 4: Selective Underlining 61
    Direct Instruction 61
    Guided Practice 61
  Strategy 5: Summarizing 61
    Prerequisites to Summarizing 62
    Direct Instruction 62
    Guided Practice 62
  Strategy 6: One-Sentence Summaries 62
    Direct Instruction 63
      Exhibit 4.2: Summary Worksheet and Framed Paragraph 64
    Guided Practice 65
  Strategy 7: Reciprocal Teaching 65
    Direct Instruction 65
    Guided Practice 65
  Strategy 8: Question-Answer Relationships 66
    Direct Instruction 66
    Guided Practice 66
  Strategy 9: Conceptual Mapping 67
    Formal Conceptual 67
    Direct Instruction 67
      Exhibit 4.3: Sample Text and QAR Questions 68
    Guided Practice 70
    Student-Directed Mapping 70
  Strategy 10: Story Mapping 71
    Character, Setting, and Sequence Maps 72
    Direct Instruction 72
    Guided Practice 72
Summary 73

Chapter 5: Learning Guides and Writing Strategies 75
Part 1: Learning Guides 75
  Strategy 1: Two-Column Notes 75
    Direct Instruction 76
      Exhibit 5.1: Social Studies Two-Column Notes 77
      Exhibit 5.2: Language Arts Two-Column Notes 77
      Exhibit 5.3: Mathematics Two-Column Notes 78
    Guided Practice 79
      Exhibit 5.4: A Guide for Writing a Study Guide 80
      Learning Guide Variations 81
    Three- to Four-Column Study Guides 81
      Exhibit 5.5: Science Three-Column Notes 82
      Exhibit 5.6: Science Three-Column Notes 82
      Exhibit 5.7: Mathematics Four-Column Notes 83
      Exhibit 5.8: Mathematics Four-Column Notes 83
      Exhibit 5.9: Reading Graphs: Four-Column Notes 84
      Exhibit 5.10: Language Arts Four-Column Notes 85
  Strategy 2: Problem-Solution Guide 86
    Direct Instruction 86
    Guided Practice 86
      Exhibit 5.11: Cause-Effect Signal Words 87
      Exhibit 5.12: Science Problem-Solution 87
      Exhibit 5.13: English Problem-Solution 87
      Exhibit 5.14: Alternative Format Problem-Solution 88
  Strategy 3: Story Grammars 89
    Story Grammar Format 1 89
      Exhibit 5.15: Story Grammar Format 1 90
        Direct Instruction 91
        Guided Practice 91
          Exhibit 5.16: Alternative Story Grammar Map 92
          Exhibit 5.17: Plot Summary Worksheet 93
          Exhibit 5.18: Outside Reading Reports 94
    Story Grammar Format 2 95
      Direct Instruction 95
      Guided Practice 96
  Strategy 4: Opinion/Proof 96
    Direct Instruction 96
    Guided Practice 97
      Exhibit 5.19: Social Studies Opinion/Proof 98
      Exhibit 5.20: Social Studies Opinion/Proof 99
      Exhibit 5.21: English Opinion/Proof 100
      Exhibit 5.22: Science Opinion/Proof 100
      Exhibit 5.23: Organizing Information Through Power Thinking 101
      Exhibit 5.24: English Spool Paper 102
      Exhibit 5.25: English Opinion/Proof Worksheet 104
      Exhibit 5.26: Science Opinion/Proof 105
Part 2: Writing Strategies 106
  Strategy 1: Content Journals 106
    Direct Instruction 106
    Guided Practice 106

Strategy 2: Framed Paragraphs 107
  Direct Instruction 107
  Guided Practice 108
    Exhibit 5.27: Framed Paragraph: Science Report: Elementary Level 109
    Exhibit 5.28: Framed Paragraph: Science Laboratory Report: Secondary Level 109
    Exhibit 5.29: Framed Paragraph: Science Laboratory Report: Secondary Level 110
    Exhibit 5.30: Framed Paragraph: Social Studies 112
    Exhibit 5.31: Framed Paragraph: Language Arts 112
Strategy 3: Spool Papers 113
  Direct Instruction 113
  Guided Practice 113
    Exhibit 5.32: Spool System Diagram 114
    Exhibit 5.33: Transition Words Useful in Framed Paragraphs and Spool Papers 115
    Exhibit 5.34: Spool Paper Editing Sheet 116
    Exhibit 5.35: Sample Spool Paper #1 117
    Exhibit 5.36: Sample Spool Paper #2 118
    Exhibit 5.37: Social Studies Spool Paper 119
    Exhibit 5.38: Science Spool Paper 119
Strategy 4: RAFT 120
  Direct Instruction 120
  Guided Practice 120
    Exhibit 5.39: Roles and/or Audiences for Writers 121
    Exhibit 5.40: Formats for Writing 122
    Exhibit 5.41: Fifth Grade History RAFT Paper 123
    Exhibit 5.42: Social Studies RAFT Assignments 123
    Exhibit 5.43: Science RAFT Paper 123
    Exhibit 5.44: Auto Mechanics RAFT Paper 124
    Exhibit 5.45: Mathematics RAFT Paper 124
    Exhibit 5.46: Mathematics RAFT Paper 125
    Exhibit 5.47: Biology RAFT Paper 126
Summary 127

Chapter 6: Vocabulary 129
Part 1: Word Maps and Charts 130
  Strategy 1: The Concept of Definition 130
    Direct Instruction 130
    Guided Practice 132
      Exhibit 6.1: Complete Context Vocabulary Map 134
      Exhibit 6.2: Partial Context Vocabulary Map 134
  Strategy 2: Categorization 135
    Direct Instruction 135
    Guided Practice 135
      Exhibit 6.3: Mathematics Categorization 136
  Strategy 3: Pre-Reading Brainstorming, Categorizing, and Mapping 137
    Direct Instruction 137
    Guided Practice 137
  Strategy 4: Post-Reading Brainstorming, Categorizing, and Mapping 138
    Direct Instruction 138
    Guided Practice 138
      Exhibit 6.4: Post-Reading Vocabulary Categorizing and Mapping 139

- Strategy 5: Charting, Using Semantic Feature Analysis (SFA) 140
  - Direct Instruction 140
  - Guided Practice 141

Part 2: Contextual Awareness 141
- Direct Instruction 141
- Guided Practice 141
  - Exhibit 6.5: Contextual Guidelines 142
  - Exhibit 6.6: Science Vocabulary Context 142
  - Exhibit 6.7: English Vocabulary Context 143
  - Exhibit 6.8: Social Studies Vocabulary Context 143
  - Exhibit 6.9: Eight Steps for Learning New Vocabulary 143
  - Exhibit 6.10: Vocabulary Filing System 144

Part 3: Writing Activities 145
- Strategy 1: Vocabulary Journals 145
  - Direct Instruction 145
  - Guided Practice 145
- Strategy 2: Capsule Vocabulary 146
  - Direct Instruction 146
  - Guided Practice 146
- Strategy 3: Sentence Synthesis 146
  - Direct Instruction 146
  - Guided Practice 146
    - Exhibit 6.11: Sentence Synthesis Examples 147
- Strategy 4: Sentence Expansion 148
  - Direct Instruction 148
    - Exhibit 6.12: Sample Science Sentence Expansion Exercise 148
  - Guided Practice 148
    - Exhibit 6.13: English Sentence Expansion 149
    - Exhibit 6.14: Fourth Grade English Sentence Expansion 149
- Strategy 5: Framed Paragraphs 150
  - Exhibit 6.15: Sample Framed Paragraphs 150

Part 4: Structural Analysis 151

Summary 151
- Exhibit 6.16: Definitions of Prefixes 152
- Exhibit 6.17: Definitions of Suffixes 154

Chapter 7: Directed Reading Thinking Activity (DRTA) 155

Part 1: General Description 155
- Step 1: Preparation for Reading 155
- Step 2: Previewing and Purpose-Setting 155
- Step 3: Guided Silent Reading 156
- Step 4: Discussion and Rereading 156
- Step 5: Following Up the Information 156
  - Exhibit 7.1: Science DRA 157
  - Exhibit 7.2: Social Studies DRA 160
  - Exhibit 7.3: English DRA 165
  - Exhibit 7.4: Mathematics DRA 169

Summary 171

Glossary 173

Bibliography 177

List of Exhibits

Exhibit 2.1: Signal Words 8
Exhibit 2.2: Science Content Area Text Assessment 11
Exhibit 2.3: Social Studies Content Area Text Assessment 15
Exhibit 2.4: Language Arts Content Area Text Assessment 20
Exhibit 2.5: Mathematics Content Area Text Assessment 26
Exhibit 2.6: Teacher Think-Alouds 32
Exhibit 2.7: Science Content Area Student Guide 36
Exhibit 2.8: Social Studies Content Area Student Guide 38
Exhibit 2.9: English Content Area Student Guide 40
Exhibit 2.10: Mathematics Content Area Student Guide 42

Exhibit 3.1: Study Skills Inventory 46
Exhibit 3.2: Sample Cloze Test 51

Exhibit 4.1: Sample Background Pre-Reading Guide 57
Exhibit 4.2: Summary Worksheet and Framed Paragraph 64
Exhibit 4.3: Sample Text and QAR Questions 68

Exhibit 5.1: Social Studies Two-Column Notes 77
Exhibit 5.2: Language Arts Two-Column Notes 77
Exhibit 5.3: Mathematics Two-Column Notes 78
Exhibit 5.4: A Guide for Writing a Study Guide 80
Exhibit 5.5: Science Three-Column Notes 82
Exhibit 5.6: Science Three-Column Notes 82
Exhibit 5.7: Mathematics Four-Column Notes 83
Exhibit 5.8: Mathematics Four-Column Notes 83
Exhibit 5.9: Reading Graphs: Four-Column Notes 84
Exhibit 5.10: Language Arts Four-Column Notes 85
Exhibit 5.11: Cause-Effect Signal Words 87
Exhibit 5.12: Science Problem-Solution 87
Exhibit 5.13: English Problem-Solution 87
Exhibit 5.14: Alternative Format Problem-Solution 88
Exhibit 5.15: Story Grammar Format 1 90
Exhibit 5.16: Alternative Story Grammar Map 92
Exhibit 5.17: Plot Summary Worksheet 93
Exhibit 5.18: Outside Reading Reports 94
Exhibit 5.19: Social Studies Opinion/Proof 98
Exhibit 5.20: Social Studies Opinion/Proof 99
Exhibit 5.21: English Opinion/Proof 100
Exhibit 5.22: Science Opinion/Proof 100
Exhibit 5.23: Organizing Information Through Power Thinking 101
Exhibit 5.24: English Spool Paper 102
Exhibit 5.25: English: Opinion/Proof Worksheet 104
Exhibit 5.26: Science: Opinion/Proof 105
Exhibit 5.27: Framed Paragraph: Science Report: Elementary Level 109

Exhibit 5.28: Framed Paragraph: Science Laboratory Report: Secondary Level 109
Exhibit 5.29: Framed Paragraph: Science Laboratory Report: Secondary Level 110
Exhibit 5.30: Framed Paragraph: Social Studies 112
Exhibit 5.31: Framed Paragraph: Language Arts 112
Exhibit 5.32: Spool System Diagram 114
Exhibit 5.33: Transition Words Useful in Framed Paragraphs and Spool Papers 115
Exhibit 5.34: Spool Paper Editing Sheet 116
Exhibit 5.35: Sample Spool Paper #1 117
Exhibit 5.36: Sample Spool Paper #2 118
Exhibit 5.37: Social Studies Spool Paper 119
Exhibit 5.38: Science Spool Paper 119
Exhibit 5.39: Roles and/or Audiences for Writers 121
Exhibit 5.40: Formats for Writing 122
Exhibit 5.41: Fifth Grade History RAFT Paper 123
Exhibit 5.42: Social Studies RAFT Assignments 123
Exhibit 5.43: Science RAFT Paper 123
Exhibit 5.44: Auto Mechanics RAFT Paper 124
Exhibit 5.45: Mathematics RAFT Paper 124
Exhibit 5.46: Mathematics RAFT Paper 125
Exhibit 5.47: Biology RAFT Paper 126

Exhibit 6.1: Complete Context Vocabulary Map 134
Exhibit 6.2: Partial Context Vocabulary Map 134
Exhibit 6.3: Mathematics Categorization 136
Exhibit 6.4: Post-Reading Vocabulary Categorizing and Mapping 139
Exhibit 6.5: Contextual Guidelines 142
Exhibit 6.6: Science Vocabulary Context 142
Exhibit 6.7: English Vocabulary Context 143
Exhibit 6.8: Social Studies Vocabulary Context 143
Exhibit 6.9: Eight Steps for Learning New Vocabulary 143
Exhibit 6.10: Vocabulary Filing System 144
Exhibit 6.11: Sentence Synthesis Examples 147
Exhibit 6.12: Sample Science Sentence Expansion Exercise 148
Exhibit 6.13: English Sentence Expansion 149
Exhibit 6.14: Fourth Grade English Sentence Expansion 149
Exhibit 6.15: Sample Framed Paragraphs 150
Exhibit 6.16: Definitions of Prefixes 152
Exhibit 6.17: Definitions of Suffixes 154

Exhibit 7.1: Science DRA 157
Exhibit 7.2: Social Studies DRA 160
Exhibit 7.3: English DRA 165
Exhibit 7.4: Mathematics DRA 169

CHAPTER 1

Project CRISS

We designed project CRISS to help our students learn more effectively throughout the curriculum. Our project focuses on teaching students how to learn through reading, with studying, and writing strategies incorporated with content instruction. Although the project began as a high school program, we have expanded our audience over the years. The ideas presented in this manual are appropriate for any elementary, middle school, or high school teacher who uses reading as part of content instruction.

As content teachers we understand that our job is not only to impart content, but to teach students how to learn content. This dual effort produces rich dividends. Not only do our students learn more content, but they leave our classrooms with skills that enable them to continue learning on their own.

Project CRISS arose from our concern about students' inabilities to learn from reading assignments. We assigned reading selections only to find that our students gained little information from their assignments. Since we would then be forced to review the material in class, little time remained to expand upon textual information. Student passivity became the rule. The more we assigned and reviewed, the more passive our students became. We began to avoid reading assignments as a mode of instruction. It was simply easier to lecture about the information.

We assumed that the problem of reading and study skills should be the focus of elementary reading and English classes, and not content courses. Yet, when we examined our school curriculum, we learned that most students are never taught how to learn from their reading. In the early grades children learn how to read, but in the middle to upper grades, there is a shift from the process of learning to read to the process of reading for content. While we spend years teaching the first process, few students ever receive explicit instruction on learning *from* reading.

Moreover, we decided that teaching students how to learn is best accomplished in real situations, where students must learn content. Even if they learn strategies as part of English and reading classes, these situations are usually too artificial to have much transfer to content learning. Yet, as content teachers we were not sure how to incorporate reading comprehension and study skills as part of our instruction.

Thus, we began a collaborative effort. Initially supported by an ESEA Title IV-C innovative grant, teachers of science, social studies, English, mathematics, and reading worked together to develop practical approaches designed to help our students learn. We began by evolving an instructional philosophy that became the foundation for project development. We had to shift our thinking from getting the content across, to teaching students how to learn content. We based much of our philosophy on psychological research.

Five principles became fundamental to practically all instructional components. First, as content teachers we saw a need to incorporate practical and theoretical ideas about text organization. Second, we wanted students to function as active learners, capable of using their existing knowledge to aid comprehension. Third, we wanted to teach our students to use a variety of learning strategies and to monitor their own learning. Fourth, we felt writing was essential for content learning. Fifth, we wanted to use direct instructional methods, following a sequence of teacher demonstraton, guided practice, and independent application. A brief description of each element sets the stage for the practical strategies that follow.

Text Organization

As content teachers, we rarely thought about how a text's organization influenced its comprehensibility. We chose a text simply on the basis of its content and neglected to examine how well a text was written in order to impart that content. Yet, research clearly indicates that students learn more easily from well-written materials (Armbruster, 1984). This is particularly true when students also understand how their text is organized and how to use this organization to aid comprehension.

Background Knowledge and Active Learning

The typical instructional format that is all too common in most content classes is to give students reading assignments with little or no preparation. Yet, the reader's **background knowledge** is the most powerful determiner of comprehension (Baker & Stein, 1981). In fact, integrating new information with prior knowledge is truly at the heart of comprehension. The more students know about the topic, the better will be their comprehension. Given these facts, the following questions became important: How can I find out what students know about a topic? How can I use this knowledge to guide students' comprehension? And, what knowledge should be developed before my students read? The answers to these questons helped us make some rather dramatic changes in our teaching.

Basically, we have now changed our emphasis from post-reading activities to pre-reading activities. We "front-load" our assignments. For example, we find out what students know about a topic before they read. If they have weak conceptual backgrounds, we pre-teach key concepts. Moreover, we also help our students set goals or purposes before they read so they can guide their own reading comprehension.

Active Learning Strategies and Self-Monitoring

Working in conjunction with the importance of background knowledge is the effect of student-generated strategies on learning content information. We knew that students learned more when using learning and reading strategies that required greater mental effort than typically occurred in our classrooms. As teachers, we began to see the need to get "off stage" and allow our students to become more actively involved in their own learning. Moreover, we wanted our students to become competent in a variety of active approaches to reading, studying, and learning.

In addition, we wanted our students to become more aware of their own strategies for comprehending and studying. This self-awareness is called **metacognition.** For example, a good reader monitors his own comprehension while reading. He knows whether or not he understands what he reads, and knows if he has studied sufficiently to master an assignment. If he is not understanding and remembering information, he has a variety of reading and studying strategies that he can orchestrate to succeed. Immature readers, on the other hand, often think they understand when in fact they do not. Nor are they aware of specific reading and studying strategies that can improve their comprehension. Thus, students need direct instruction in monitoring, whether or not their strategies are leading to the desired end.

Writing

Writing is one of our most powerful techniques for helping students learn and think critically about content information. Students simply learn more if they write about the information they are learning (Doctorow, Wittrock & Marks, 1978). Moreover, recent research suggests that the development of writing skills enhances the development of reading skills (D'Angelo, 1983).

These conclusions make sense when one thinks about the interrelationships of reading, writing, and learning. We have already noted that learning involves (1) incorporating new knowledge with what we already know about a topic and (2) integrating new information within our own personal frame of reference.

To personalize meaning, a reader must become actively engaged in understanding and interpreting new information. Writing encourages such personalized learning because writing requires students to use their own words and ideas to express a new concept. By providing students with the opportunity to make personal sense out of the information being presented, writing moves learning from a receptive, passive phenomenon to an active, productive one.

Writing and reading involve similar processes. Tierney and Pearson (1983) remark that the writing process involves planning, composing, and revising. Good reading involves similar sub-processes. Readers plan their reading, set purposes, compose tentative meanings while they read, and constantly revise their learning based on the information in the text and their own store of background knowledge.

Given the effectiveness of writing in learning content information, and our focus on active, student-generated strategies, we have incorporated writing throughout the CRISS project.

Direct Instruction

Finally, we wanted to teach reading strategies directly. The body of research indicates that students receive little instruction in comprehension and studying. Even though this problem is certainly apparent in secondary schools, it is also prevalent at the elementary level. For example, Durkin (1978–1979) observed 17,996 minutes of reading instruction and found only 45 minutes of this total time allotted to instruction in comprehension. Practically all instructional time was spent having students practice skills through worksheets and other seatwork activities that test but cannot teach comprehension. If students had difficulty with a certain skill, the remedy was not instruction but more worksheets.

In examining teachers' manuals for various reading series, Durkin noted that the blame for such an emphasis does not rest only with the teacher. Manuals contained very few suggestions about how to teach comprehension. Suggestions focused on assignments rather than on ways to model, demonstrate, and guide students in solving comprehension tasks.

Nevertheless, the situation is not as bleak as it may appear. There has been a flurry of research supporting a general model of instruction which works across a range of text and strategies. Basically, instruction needs to progress from teacher control to student independence. At first, we must be in command of the learning situation and formally teach the skill. We explain why a particular strategy is important, and then discuss, demonstrate, and think-aloud while modeling the skill. As the students learn, there is a gradual release of responsibility from teacher to students. Finally, when our students begin to succeed on their own, we can assign them to practice the strategy independently.

We recommend the progression from teacher demonstration, to guided practice, to independent application for all teaching strategies documented in this manual. Throughout this guide are examples of how this model of instruction is used in our classrooms.

The Implications of the CRISS Project

Thus, fueled by research in learning, background knowledge, text organization, active student-generated strategies, self-monitoring, and a new model for delivering instruction, we took a fresh look at our profession. Two conclusions became apparent. First, we thought very differently about reading comprehension, and second, we saw our roles as teachers begin to change.

We no longer thought of reading comprehension as passive and receptive. Instead, we saw the reader as active, creative, and constructive. Readers use their rich background knowledge as a basis for constructing meaning. Readers predict, hypothesize, and monitor ideas as they actively build meaning. It is almost as if the reader negotiates with the author (Pearson, 1985), with the teacher "playing the role of guide in helping students to negotiate meaning."

Given the concept of a mature reader, we saw a need to change our roles as teachers. We no longer saw ourselves as managers, responsible for arranging materials, giving lectures, and making assignments. Instead we began to assume a more central role, which David Pearson (1985, pp. 736–737) so aptly describes in the following comments:

> I would like to propose a new model for the 1980's—a model in which the teacher assumes a more central and active role in providing instruction, a model in which practice is augmented by teacher modeling, guided practice and substantive feedback, a model in which the teacher and the child move along that continuum of task responsibility, a model that says just because we want students to end up taking total responsibility for task completion does not mean that we should begin by giving them total responsibility.

In this model, teachers assume new and different roles: They become sharers of secrets, co-conspirators, coaches, and cheerleaders. Because they realize that they are readers and writers who share an interpretive community with their students, they become willing to share the secrets of their own cognitive successes (and failures!) with students.

They often co-conspire with their students to see if they can "get the author" or try to "trick the reader." They act sometimes the way good coaches do; they are there at just the right moment with just the right piece of information or just the right pat on the back. And they act as cheerleaders for their students, encouraging them to take new steps toward independence and focusing on their remarkable strengths rather than their weaknesses.

As a metaphor for this new model, I would like to replace the metaphor of *teacher as manager* with a metaphor of the *teacher as teacher.* I know the idea is not startlingly fresh, but it does have a nice ring to it.*

---

*From P. David Pearson, "Changing the Face of Reading Comprehension," *The Reading Teacher,* 1985. Reprinted with permission of P. David Pearson and the International Reading Association.

CHAPTER 2

Textbook Assessment

The first step in a content approach to instruction is a thorough understanding of the strengths and weakness of our reading assignments. We must be sensitive to the relative difficulty or ease of our assignments. We can expect far more independence from our students when assignments contain clearly developed concepts than when they contain poorly specified ideas. Reading comprehension involves an interaction of student, text, and teacher. Our instructional approaches and our students' strategic behaviors are inherently bound to text. Knowing the author's craft or style of presentation helps both teachers and students begin to define this interaction.

This chapter is divided into four parts. The first is a brief critique of readability formulas. The second part focuses on qualities of well-written text, and the third section contains separate assessment checklists for science, social studies, language arts, and mathematics. Part 4 contains teaching suggestions that will help students become aware of an author's craft.

Part 1: Readability Formulas

Many teachers and publishers have traditionally assessed text difficulty through the application of **readability formulas.** This approach has received criticism, with justification (Davison, 1982). Evaluating a text strictly through the application of readability formulas provides only a superficial estimate of text difficulty because the factors considered are very limited. Since publishers still use such assessments to advertise books, it is important that we as consumers understand the limitations of readability formulas.

Most readability assessments are based on only two criteria: sentence length and vocabulary difficulty, as measured by the number of syllables in 100-word samples. However, both of these factors are peripheral to more important variables influencing text difficulty. For example, research demonstrates that students learn more readily from well-written material that follows a consistent pattern of organization (Anderson and Armbruster, 1984). One needs to evaluate the content, overall text organization, chapter, paragraph, and sentence structure, vocabulary presentation, and the use of visual information. Although these factors are central to comprehensibility, they are not included in traditional readability formulas.

To compound the problem, readability assessments have been used as a criteria for text revision. In an effort to lower reading levels, editors have abbreviated sentence length. As a result, texts often become less readable because of choppy, short sentences. Editors have also replaced precise technical vocabulary with more common, shorter words, often complicating rather than simplifying the presentation. As a consumer, carefully evaluate publishers' claims about readability. Even though a book may be advertised as written on a specific level, be wary of such claims. A publisher's evaluation does not preclude your own thorough examination of the text's structure and organization.

Even when evaluating a selection, it is often difficult to know if a reading assignment will be easy or difficult for students. This is particularly true for content teachers because we know our subject areas and we understand the content of our assignments. Our own familiarity often camouflages textual problems that affect our students. Because we have rich background knowledge about the content, the reading materials seem easy and elementary, but in reality they are quite difficult for our students, who have relatively little background. Therefore, we should examine a text from the point of view of a student who has little prior knowledge about the content. Have a colleague—or better yet, a student—evaluate texts with you. Part 2 provides a step-by-step procedure for conducting such an evaluation.

Part 2: The Qualities of a Well-Written Text

There are a series of steps to follow in order to determine whether a text is a well written one. These are content evaluation, chapter organization, sentence structure, content signals, concept development, vocabulary density, contextual clues, and visual information.

Content Evaluation

Begin your examination of a text by first evaluating its content and overall organization. Is the **content** appropriate to your own and your district's instructional goals? (See the appropriate checklist in Part 3.)

If the content is appropriate, you should then go on to examine carefully the text's **organization** and how it imparts content. Research in reading has clearly indicated that the structure or coherence of text influences its usefulness as a learning tool (Armbruster, 1984). The text should not only be well organized, but its organization should be apparent to the reader. A considerate author practices his craft consciously and follows the same organizational style throughout the text.

Begin by examining the overall structure of the text to determine the presence or absence of such features as a table of contents, glossary, index and appendix. (See the section on Overall Organization of the appropriate checklist in Part 3.)

Organization within Chapters

Next, choose a chapter from the text and assess its organization. See if the author organized information around bold print **topics** and **subtopics.** If the answer is yes, note whether the topic headings actually reflect the section's main ideas. In many cases, topics represent information that is not stressed in the material, hindering comprehension.

Note also if the chapter contains an **introduction** which provides an overview of the chapter content. In this overview does the author also remind the student of background knowledge needed to understand the upcoming selection? Does the author focus the reader's attention through statements or questions about concepts that the students should learn?

Next, read the material following the introduction. Has the author developed topics presented in the introduction? Are these ideas presented clearly? Then examine the **conclusion** to the chapter. Is there a summary of the information presented in the body of the chapter, and does this summary also reflect ideas presented in the introduction? Finally, note if the author has included study questions so students can self-review the chapter's concepts. Do the questions cover more than details and facts? Do they require a higher level of thinking by using key words such as *why, analyze,* and *evaluate?*

Now read through the chapter to determine if there are any consistent patterns of **main idea development** within paragraphs. Are main ideas developed explicitly, or must students infer them from the material? If the author forces the reader to infer main ideas, the text is more difficult than ones in which main ideas are explicit. If main ideas are explicit, determine any consistencies about their location. Typically, main ideas located at the beginning of paragraphs are easier for students to identify than those placed in other positions within the paragraph.

Examine several paragraphs, and analyze how the author uses details to develop main points. Are details used effectively? A common problem, particularly in science materials, is the inclusion of superfluous details which actually detract from concept development. Has the author included any irrelevant details which confuse main idea presentations?

Sentence Structure

Sentence complexity influences text difficulty. Well-written prose contains sentences of varied length. Students have more difficulty with reading material written consistently with long, complex sentences than with content written with simpler sentence forms. Simpler sentence patterns typically contain active rather than passive verbs. For example, the following sentence contains a passive verb and is more complex than the next sentence written in active voice: "Text complexity *is caused* by a variety of factors such as paragraph patterns, verb forms and vocabulary difficulty." The same sentence written in active voice reads: "Verb forms, paragraph patterns, and vocabulary difficulty *increase* text difficulty."

Content Signals

Clear signals regarding text structure influence comprehensibility. These include key words that indicate sequence of ideas, examples, importance, and conclusions. The more direct the author is in supplying these clues to content organization, the easier it is for students to understand course content. Exhibit 2.1 presents lists of **signal words** used in well-written text:

Exhibit 2.1

Signal Words

Emphasis Words

above all
central issue
chief factor
chief outcome
distinctive quality
especially relevant
especially valuable
important to note
key feature
main value
major event
most noteworthy
most of all
most substantial issue
pay particular attention to
primary concern
principle item
remember that
should be noted
significant factor
vital force

Illustration Words

for example
for instance
once
specifically
such as
to illustrate

Conclusion Words

as a result
consequently
finally
hence
in conclusion
in summary
last of all
therefore
thus

Change-of-Direction Words

but
conversely
even though
however
in contrast
instead
nevertheless
on the contrary
on the other hand
otherwise
still
yet

Addition Words

a final reason
again
also
another
finally
first,
first of all
for one thing
furthermore
in addition
last of all
likewise
moreover
next
one
other
secondly
the third reason

Concept Development

How clearly does the author present new **concepts?** This question brings forth some subtleties often missed in a cursory examination of a text. Read through the explanation of a major concept, and determine whether a student with little background knowledge could understand the author's message. Keep in mind several key variables. First, does the author link new concepts to something familiar in the students' background? Second, is explanatory information relevant to the concept? Inclusion of irrelevant information and extraneous details is confusing. Third, are there clear examples of the concept, and are these examples more familiar than the concept being explained? Is the concept explained through everyday common phenomena and tied to known information? Fourth, do explanations move from definitions to examples? We have found that students have an easier time understanding new ideas if they are first clearly defined and then followed by examples rather than organized inductively, with the author presenting examples first and then discussing the concept.

Next, examine how the author develops **new vocabulary.** Each content area has its own technical and non-technical vocabulary which students must understand in order to master a discipline. The sheer frequency of unfamiliar words influences the comprehensibility of text. In addition, comprehensibility is also influenced by the presence or absence of contextual clues which clarify unfamiliar words. Contextual clues vary by type; some are easier for students to use than others.

Vocabulary Density

Choose two 1000 word samples from your text, and have a colleague (or preferably a group of your own students) circle all unfamiliar vocabulary in the samples, both technical and non-technical. It is difficult for those of us who are teaching content to know which concepts might create difficulty for those unfamiliar with content, so an outsider's evaluation is usually more valid. As a rough rule of thumb, if more than 30 words per 1000 are circled, **vocabulary density** will probably create some problems for students and you must make adjustments in your instruction. (Note: In math texts, choose samples of 100 words. If more than 5 words per 100 are circled, students may experience problems.)

Contextual Clues

Authors usually explain many unfamiliar terms within the **context** of the selection. The more explicit the explanation, the easier it will be for the students to understand.

It is important to note first whether or not your author tends to use context to develop the meaning of technical and non-technical terms. The most difficult situation occurs when authors use vocabulary unfamiliar to students without supplying any clues to word meaning. It is more likely, however, that the author does, in fact, use some **contextual clues.** The next step is to determine the types of clues used. We have found that some types of clues are much easier for students to use than others.

As a part of the CRISS Project, several teachers systematically examined the relative difficulty of various contextual clues. Their students had the most difficulty learning new vocabulary when authors used inferential clues, and the least difficulty when they used direct definition and restatement clues. Vocabulary developed through example clues proved to be moderately difficult for most high school students.

Thus, it is important for a teacher to be aware of stylistic variables involving context. Analyze one of the 1000 word text samples that you used in your evaluation of vocabulary density to determine how the author used context to develop the meanings of the circled words. You may discover that the author has not used contextual clues to develop new terminology. Note this situation on the checklist. Use the examples contained in each of the four content checklists as a guide for evaluating the types of clues your author uses, and record the information on the appropriate checklist.

Visual Information

Evaluate **visual aids** such as pictures, graphs and charts intended to make a text more readable. You may want to focus this evaluation on a chapter or section of the book. Has the author used a sufficient number of visual aids? Note whether or not the visuals are placed appropriately in the text. Are they located on the same page as the written information? In the written material, have the authors explicitly directed the reader to a particular aid? How well do captions explain the visuals? Finally, do visuals adequately represent gender and various racial groups?

Part 3: Textbook Assessment Checklists

This section is made up of four exhibits, each of which is a checklist for assessing texts in the specific content areas of science, social studies, language arts, and mathematics. Appended to each checklist are specific examples of contextual clues most effective for that discipline.

Exhibit 2.2

Science Content Area Text Assessment

Name of text ______________________

Class ______________________

Author(s) ______________________

Copyright ______________________

Grade ______________________

Publisher ______________________

A. Overall Structure of book

1. Table of Contents	Yes	No
2. Glossary	Yes	No
3. Index	Yes	No
4. Appendix	Yes	No

B. Overall Content

Circle the appropriate response	Yes	Sometimes	No
1. Does the content of the text reflect what you feel are essential concepts in your course?	Y	S	N
2. Examine the topics presented in each chapter. Does the content flow in a logical progression, from simple to complex?	Y	S	N
3. Is the information in this science text up-to-date?	Y	S	N
4. Choose several selections representing topics reflecting recent developments in the field (astronomy) and evaluate the content presented.			
a. Is the vocabulary up-to-date?	Y	S	N
b. Are the theories and laws current?	Y	S	N
c. Are the laboratories and activities appropriate to recent advancements?	Y	S	N

C. Organization within Chapters

1. Does the title of the chapter specify the main idea of the selection?	Y	S	N
2. Is the chapter information broken down into subtopics?	Y	S	N
3. Do titles and subtopics appropriately reflect the main ideas specified in the section?	Y	S	N
4. Does the chapter contain introductory statements, questions, paragraphs, or sections?	Y	S	N
5. In the chapter introduction, are there questions or statements which focus the readers' attention to what they should learn from the chapter?	Y	S	N
6. Is sufficient background knowledge provided so that students can link new knowledge with information previously learned?	Y	S	N

7. Does the author include statements which remind students about information they already know about the topic? Y S N

8. Read the material following the introductory paragraphs. Does the author follow through in developing ideas specified in the introduction? Y S N

9. Examine the summary or conclusion. Does the author summarize the essential concepts in the conclusion? Y S N

10. Does the summary reflect ideas presented in the introduction? Y S N

11. Are study questions integrated within subtopics for self-review? Y S N

    a. Do these questions help the students evaluate the information in the text? Y S N

    b. Do the questions ask the students to analyze the information? Y S N

    c. Do the questions guide the students to generate their own ideas? Y S N

D. Paragraph Development

1. Main Idea Development

Examine a section of the chapter. Read it through to determine if there is a consistent pattern of main idea development. If the answer is yes, analyze the pattern.

a. Are main ideas generally explicit? Y S N

b. If main ideas are explicit, answer the following (check whichever is most appropriate):

    1. Main ideas are usually specified at the beginning of paragraphs. Y S N

    2. Main ideas are usually specified at the end of paragraphs. Y S N

    3. There is no specific pattern of main idea location. Y S N

2. Details

Choose four paragraphs where main ideas are explicitly stated. Explain the details used to develop the main ideas.

a. Are details relevant to the development of main idea? Y S N

b. Are there a sufficient number of details for the development of the main idea? Y S N

E. Sentence Level

1. Are sentences consistently short and simple? Y S N

2. Are most verbs in the active voice? Y S N

3. Does the author use explicit signals to indicate sequencing of ideas (*first, second, third*)? Y S N

4. Does the author use emphasis words to indicate important concepts (*most of all, a key feature, a significant factor*)? Y S N

5. Does the author use explicit signals to indicate comparisons (*but, however, on the other hand*)?	Y	S	N
6. Does the author use explicit signals for illustrations (*for example, such as*)?	Y	S	N
7. Does the author use explicit signals for conclusions (*therefore, as a result*)?	Y	S	N

F. Concept Development

1. Are new concepts linked to a student's prior knowledge?	Y	S	N
2. Are concepts first defined and followed by clear, less abstract examples?	Y	S	N
3. Are concepts explained clearly, with sufficient elaboration?	Y	S	N
4. Are questions provided for students to self-review concepts?	Y	S	N

G. Vocabulary Density

1. Choose two 1000-word samples from your text, and circle all technical and nontechnical vocabulary which your students might not know (or let a student circle words).
2. Count the number of circled words and record below:

Number of Unfamiliar Words

Selection 1. ______________________________

Selection 2. ______________________________

If more than 30 words per selection are circled, vocabulary density will probably create some problems for your students.

H. Contextual Clues

1. Using one of the selections above, determine if the author used context to develop meaning of the circled words. (See the following pages for an explanation of contextual clues.)

Types of Contextual Clues Used in Text

Total number of unfamiliar words in selection ____________

Number of words developed through context ____________

• Number of direct definitions ____________

• Number of restatements ____________

Number of inferences ____________

Number of examples ____________

Number of other ____________

• These context clues will be the easiest for your students.

I. Visual Aids

Choose one chapter in your text, and examine the pictures, graphs, maps, charts, and other visual aids.

	Yes	Sometimes	No
1. Do you think the author has used a sufficient number of visual aids?	Y	S	N
2. How appropriately are visual aids placed in the text? Are the visual aids located on the same page as the written information describing the aids?	Y	S	N
3. Does the author explicitly direct the reader to refer to a particular visual aid?	Y	S	N
4. Are visual aids appropriately labeled?	Y	S	N
5. Are pictures representative of race and gender?	Y	S	N

Science Contextual Clues

Before analyzing how the author uses context, read the following analysis of the most common contextual clues.

Direct Definition

Context clues classified as **direct definition** typically have the word being taught as the subject of the sentence. The subject is often followed by a linking verb and the definition.

1. *Symbiosis* is the relationship between two organisms where both are benefited.
2. The study of the relationships of living things to each other and to their physical environment is called *ecology.*

Restatement

Context clues classified as **restatement** have the word being taught explained through an appositive or some "direct signaling" by the author. Students must learn to attend to punctuation and signal words indicating an explanation. Some examples of "signal words" are *that is, or, appear, as, in other words.*

1. *Parasites,* organisms living at the expense of another, are found on many plants.
2. *Angiosperms,* or flowering plants, are prevalent in Glacier Park.

Example

If the author explains a concept predominantly through the use of **examples**, inferential thinking is also required. Students must understand what the items have in common before arriving at the generalized meaning expressed in the concept. Example clues are very common in science.

1. *Parasites,* such as mosquitoes, tape worms, and lice, can be very irritating to the host.
2. A list of North American *predators* might include grizzly bears, mountain lions, wolves, and foxes.

Inference

Context clues are classified as **inferences** if the author does not include any signal words indicating that a concept is being explained. In addition, the meaning of the term is not directly stated in the sentence. Students have to infer what the term might mean.

1. Most familes contain two *generations,* parents and children.
2. Mountain lions *prey* on deer.

Exhibit 2.3

Social Studies Content Area Text Assessment

Name of text ____________________

Class ____________________

Author(s) ____________________

Copyright ____________________

Grade ____________________

Publisher ____________________

A. Overall Structure of the book

1. Table of Contents	Yes	No
2. Glossary	Yes	No
3. Index	Yes	No
4. Appendix	Yes	No

B. Overall Content:

Circle the appropriate response	Yes	Sometimes	No
1. Does the overall content of the text reflect what you feel are essential concepts in your course?	Y	S	N
2. Examine the scope and sequence of the content. Is the content presented topically, or chronologically, or are the two methods combined? Based on these considerations, is the scope and sequence appropriate to the material covered in the text?	Y	S	N
3. Examine (if applicable) sections of your text which focus on more recent issues. Is the content up-to-date?	Y	S	N

C. Organization of Chapters

1. Does the title of the chapter specify the main idea of the selection?	Y	S	N
2. Is chapter information broken down into subtopics?	Y	S	N
3. Do titles and subtopics appropriately reflect the main ideas specified in the section?	Y	S	N
4. Does the chapter contain introductory statements, questions, paragraphs, or sections?	Y	S	N
5. In the chapter introduction, are there questions or statements which focus the readers' attention to what they should learn from the chapter?	Y	S	N
6. Is sufficient background knowledge provided so that students can link new knowledge with information previously learned?	Y	S	N
7. Does the author include statements which remind students about information they already know about the topic?	Y	S	N
8. Read the material following the introductory paragraphs. Does the author follow through in developing ideas specified in the introduction?	Y	S	N

9. Examine the summary or conclusion. Does the author summarize the essential concepts in the conclusion? Y S N

10. Does the summary reflect ideas presented in the introduction? Y S N

11. Are study questions integrated within subtopics for self review? Y S N
    - a. Do these questions help the students evaluate the information in the text? Y S N
    - b. Do the questions ask the students to analyze the information? Y S N
    - c. Do the questions guide the students to generate their own ideas? Y S N

D. Paragraph Development

1. Main Idea Development

Examine a section of the chapter. Read it through to determine if there is a consistent pattern of main idea development. If the answer is yes, analyze the pattern.

- a. Are main ideas generally explicit? Y S N
- b. If main ideas are explicit, answer the following (check whichever is appropriate):
    - 1. Main ideas are usually specified at the beginning of paragraphs. Y S N
    - 2. Main ideas are usually specified at the end of paragraphs. Y S N
    - 3. There is no specific pattern of main idea location. Y S N

2. Details

Choose four paragraphs where main ideas are explicitly stated. Examine the details used to develop the main ideas.

- a. Are details relevant to the development of main idea? Y S N
- b. Are there a sufficient number of details for the development of the main idea? Y S N

E. Sentence Level

1. Are sentences consistently short and simple? Y S N

2. Are most verbs in the active voice? Y S Y

3. Does the author use explicit signals to indicate sequencing of ideas (first, second, third)? Y S N

4. Does the author use emphasis words to indicate important concepts (*most of all, a key feature, a significant factor*)? Y S N

5. Does the author use explicit signals to indicate comparisons (*but, however, on the other hand*)? Y S N

6. Does the author use explicit signals for illustrations (*for example, such as*)? Y S N
7. Does the author use explicit signals for conclusions (*therefore, as a result*)? Y S N

F. Concept Development

1. Are new concepts linked to a student's prior knowledge? Y S N
2. Are concepts first defined, then followed by clear examples? Y S N
3. Are concepts explained clearly, with sufficient explanation? Y S N
4. Are questions provided for students to self-review concepts? Y S N

G. Vocabulary Density

1. Choose two 1000-word samples from your text, and circle all technical and non-technical vocabulary which your students might not know.
2. Count the number of circled words and record below:

Selection 1. ____________________

Selection 2. ____________________

If more than 30 words per selection are circled, vocabulary density will probably create some problems for your students.

H. Contextual Clues

Using one of the selections above, determine if the author used context to develop meaning of the circled words. (See the following pages for an explanation of contextual clues.)

Types of Contextual Clues Used in Text

Total number of unfamiliar words in selection ____________

Number of words developed through context ____________

* Number of direct definitions ____________

* Number of restatements ____________

Number of contrasts ____________

Number of inferences ____________

Number of examples ____________

Number of other ____________

---

* These context clues will be the easiest for your students.

I. Visual Aids

Choose one chapter in your text, and examine the pictures, graphs, maps, charts and other visual aids.

	Yes	Sometimes	No
1. Do you think the author has used a sufficient number of visual aids?	Y	S	N
2. How appropriately are visual aids placed in the text? Are the visual aids located on the same page as the written information describing the aids?	Y	S	N
3. Does the author explicitly direct the reader to refer to a particular visual aid?	Y	S	N
4. Are visual aids appropriately labeled?	Y	S	N
5. Are pictures representative of race and gender?	Y	S	N

Contextual Clues

Social Studies

Before analyzing how the author of your text uses context, read the following analysis of the most common contextual clues.

Direct Definition

Context clues classified as **direct definition** typically have the word being taught as the subject of the sentence. The subject is often followed by a linking verb and the definition.

1. An *orator* is a person with great speaking ability.
2. *Corporation* means a business owned by stockholders.
3. The *urbanization movement* is defined as the shift of people from the country to the city.

Restatement

We classify context clues as **restatement** if the word being taught is explained through an appositive or some "direct signaling" by the author. Students must learn to attend to punctuation and signal words indicating an explanation. Some examples of "signal words" are *that is, or, appear, as, in other words.*

1. Americans believe in *Manifest Destiny*, or their right to control all of North America.
2. *Nationalism*, the feeling people have toward their country, is stronger in time of war.
3. The colonies decided to *cooperate*, in other words, work together in their fight against the British.

Contrast

When an author relies on **contrast,** a concept is explained by what it does not mean. Students need to be aware of the author's signals (*instead of, rather than*) as clues to contrast and be aware of how to reverse the definition to understand the meaning of the vocabulary word.

1. Instead of being pleasant and agreeable, the British and the colonists were becoming *antagonistic*.
2. The *opposition*, not those who supported colonial independence, wanted the continuation of British control.
3. Opposed to becoming *Christianized*, many Indians continued to follow their own religions.
4. Rather than being pleased with one another, the British and the colonists had considerable *resentment* for one another.

Inference

We classify context clues as **inferences** if the author does not include any signal words indicating what concept is being explained. In addition, the meaning of the term is not directly stated in the sentence. Students have to infer what the term might mean.

1. George III, who wanted more control of the colonists, issued in 1763, a *proclamation* ordering the settlers to withdraw from all lands west of the Appalachian Mountains.
2. With the *Writs of Assistance*, the British now had the right to search any colonist's personal belongings at any time without the colonist's consent.
3. In the years before the Civil War, many people belonged to the *abolition* movement. They wanted to end slavery in America.

Example

We classify items as **examples** if the author explains a concept primarily through the use of examples. With examples, inferential thinking is also required. Students must understand what the items have in common before arriving at the generalized meaning expressing the concept.

1. *Tariffs*, including taxes on imported molasses, sugar, tea and rum made the colonists angry.
2. The Stamp Act, Sugar Act and Molasses Act were *levies* which the colonists disliked.
3. *Rural states* such as Montana, Wyoming and North Dakota are nice places to live.

Exhibit 2.4

Language Arts Content Area Text Assessment

Name of text ______________________________

Class ______________________________

Author(s) ______________________________

Copyright ______________________________

Grade ______________________________

Publisher ______________________________

A. Overall Structure of book

1. Table of Contents	Yes	No
2. Glossary	Yes	No
3. Index	Yes	No
4. Appendix	Yes	No

B. Overall Content

1. Does the content of the text reflect what you feel are critical literary concepts and selections for the course you are teaching?	Yes	No
2. Is there an appropriate mixture of literary types?	Yes	No

C. Organization within Units or Sections of Literary Anthologies

If there are thematic sections or units within your anthology, answer the following questions.

Circle the appropriate response.	Yes	Sometimes	No	N/A
1. Examine several different chapters or thematic sections within the anthology. Is there a definite and consistent organization within each section (chronological, thematic, award, genre)?	Y	S	N	N/A
2. Now, examine one section more thoroughly. Do section headings and subheadings reflect the main points specified in the section?	Y	S	N	N/A
3. Does the editor provide appropriate introductory information (historical, thematic, etc.) before students read the selection?	Y	S	N	N/A
4. Does the editor provide questions or statements which help guide the student in reading the selection?	Y	S	N	N/A
5. Is there sufficient background knowledge provided so that students can link new knowledge with information previously learned?	Y	S	N	N/A

6. Does the author include statements which remind students about the information they already know about a topic?	Y	S	N	N/A
7. Read the material following the introductory paragraphs. Does the author follow through in developing ideas specified in the introduction?	Y	S	N	N/A
8. Examine the summary or conclusion. Does the author summarize the essential concepts in the conclusion?	Y	S	N	N/A
9. Does the summary reflect ideas presented in the introduction?	Y	S	N	N/A
10. Does the editor provide discussion questions for students to use after they have completed their reading?	Y	S	N	N/A
a. Do these questions help the students evaluate the information in the text?	Y	S	N	N/A
b. Do the questions ask the students to analyze the information?	Y	S	N	N/A
c. Do the questions guide the students to generate their own ideas?	Y	S	N	N/A
11. Does the editor provide the student and teacher with useful suggestions for enrichment activities that incorporate reading, writing and speaking activities?	Y	S	N	N/A
12. Is there an approach to vocabulary development within the selection (bold type, restatement, footnotes)?	Y	S	N	N/A

D. Paragraph Development

1. Main Idea Development

Examine a section of the chapter. Read it through to determine if there is a consistent pattern of main idea development. If the answer is yes, analyze the pattern.

a. Are main ideas generally explicit?	Y	S	N	N/A
b. If main ideas are explicit, answer the following (check all that are appropriate):				
1. Are main ideas usually specified at the beginning of paragraphs?	Y	S	N	N/A
2. Or, are main ideas usually specified at the end of paragraphs?	Y	S	N	N/A
3. Or, is there no specific pattern of main idea location?	Y	S	N	N/A

2. Details

Choose four paragraphs where main ideas are explicitly stated. Examine the details used to develop the main ideas.

a. Are details relevant to the development of main idea?	Y	S	N	N/A
b. Are there a sufficient number of details used for the development of the main idea?	Y	S	N	N/A

E. Sentence Level

1. Are sentences consistently short and simple?	Y	S	N	N/A
2. Are most verbs in the active voice?	Y	S	N	N/A
3. Does the editor use explicit signals to indicate sequencing of ideas (*first, second, third*)?	Y	S	N	N/A
4. Does the editor use emphasis words to indicate important concepts (*most of all, a key feature, a significant factor*)?	Y	S	N	N/A
5. Does the editor use explicit signals to indicate comparisons (*but, however, on the other hand*)?	Y	S	N	N/A
6. Does the editor use explicit signals for illustrations (*for example, such as*)?	Y	S	N	N/A
7. Does the editor use explicit signals for conclusions (*therefore, as a result*)?	Y	S	N	N/A

F. Visual Aids

Choose one selection in your anthology, and examine the pictures and visual aids.

1. Do you think the author has a sufficient number of visual aids?	Y	S	N	N/A
2. How appropriately are visual aids placed in the text? Are the visual aids located on the same page as the written information related to the aid?	Y	S	N	N/A
3. Do the pictures reflect the mood imparted in the selection?	Y	S	N	N/A
4. Are pictures representative of race and gender?	Y	S	N	N/A

G. Concept Development

1. Are new concepts linked to a student's prior knowledge?	Y	S	N	N/A
2. Are concepts first defined, then followed by clear examples?	Y	S	N	N/A
3. Are concepts explained clearly, with sufficient elaboration?	Y	S	N	N/A
4. Are questions provided for students to self-review concepts?	Y	S	N	N/A

H. Vocabulary Density

1. Choose two 1000-word samples from your anthology, short story, or novel, and circle vocabulary which your students might not know.
2. Count the number of circled words and record below.

Selection 1. ______________________

Selection 2. ______________________

If more than 30 words per selection are circled, vocabulary density will probably create some problems for your students.

I. Contextual Clues

Using one of the selections above, determine how the author used context to develop meaning of the circled words. (See the pages following this checklist for an explanation of contextual clues.)

Types of Contextual Clues Used in Text

Total number of unfamiliar words in selection ____________

Number of words developed through context ____________

* Number of direct definitions ____________

* Number of restatements ____________

Number of contrasts ____________

Number of inferences ____________

Number of examples ____________

Number of other ____________

J. Content and Literary Structure: Short stories and novels.

1. Will the selection capture student interests?	Y	S	N	N/A
2. Is the author's style comprehensible to the students?	Y	S	N	N/A
3. Does the selection follow a simple chronological order?	Y	S	N	N/A
4. If the selection contains symbolism, is it used in a way that students can appreciate and understand the author's meaning?	Y	S	N	N/A
5. If the passage contains figurative language, is it used in a way that students can create vivid images while reading?	Y	S	N	N/A
6. If the author uses satire or irony within the selection, are the portions written so that students can appreciate and understand the author's meaning?	Y	S	N	N/A

---

*These contextual clues will be the easiest for your students.

7. Is character development such that students get to know characters through their actions and intentions?	Y	S	N	N/A
8. If you are teaching students the elements of fiction (rising action, climax, denouement) does the selection clearly represent the varying elements which you wish your students to understand?	Y	S	N	N/A
9. If you are teaching students the basic kinds of conflict (1) man vs. man; (2) man vs. nature; (3) man vs. himself, does the selection contain clear examples of the varying conflicts which you wish to teach?	Y	S	N	N/A
10. Does the selection contain a well-developed theme with sufficient supportive evidence used to develop the theme?	Y	S	N	N/A

Language Arts Contextual Clues

Direct Definition

Context clues classified as **direct definition,** typically have the word being taught as the subject of the sentence. The subject is often followed by a linking verb and the definition.

1. A *metaphor* is an implied meaning.
2. A *simile* is a figure of speech comparing two unlike things and often introduced by *like* or *as*.

Restatement

We classify context clues as **restatement** if the word being taught is explained through an appositive or some "direct signaling" by the author. Some examples of "signal words" are *that is, appear as,* and *in other words.*

1. Politicians' speeches are full of *loaded words,* that is, words that have favorable or unfavorable connotations for almost everyone.
2. Most of us use *informal English,* or in other words, a language we ordinarily use in speech and writing.

Contrast

When an author relies on **contrast,** a concept is explained by what the concept does not mean. Students need to be aware of the author's signals (*instead of, rather than*) as clues to contrast and aware of how to reverse the definition to understand the meaning of the vocabulary word.

1. This is a *survey,* not a diagnostic test.
2. *Connotation* is the emotional situation surrounding a word, as opposed to its literal meaning.
3. The mountain goat looks *clumsy,* but he is remarkably nimble.

Inference

We classify context clues as **inferences** if the author does not use any signal words to indicate that the term is being explained. In addition, the meaning of the term is not directly stated in the sentence.

1. Like all master craftsmen, the writer has a respect and concern for the *tool* he must use in his work.
2. *Motives* can be related to authors and the themes of their works.

Example

We classify terms as **examples** if the author explains a concept predominantly through the use of examples. With examples, inferential thinking is also required. Students must understand what the items have in common before arriving at the generalized meaning expressed in the term.

1. *Contractions* such as *I've, we're, don't,* and *hasn't* are used frequently in our writing.
2. A *conjunction* such as *but* should be used when showing the relationship among ideas.

Exhibit 2.5

Mathematics Content Area Text Assessment

Name of text ______________________________
Author(s) ______________________________
Copyright ______________________________
Publisher ______________________________

Class ______________________________
Grade ______________________________

A. Overall Structure of Book

1. Table of Contents	Yes	No
2. Glossary of mathematical terms, symbols, formulas	Yes	No
3. Index	Yes	No
4. Appendix	Yes	No

B. Overall Content

Circle the correct response	Yes	Sometimes	No
1. Does the content of the text reflect what you feel are essential concepts in your courses?	Y	S	N
2. Examine the topics presented in each chapter. Does the content flow in a logical progression, from simple to more complex?	Y	S	N
3. Does the text reflect the logical progression of mathematical concepts which you feel are appropriate?	Y	S	N

C. Organization of Chapters

1. Do the topics and subtopics specify the main ideas of the chapter?	Y	S	N
2. Does the author begin a new unit or chapter with a general introduction of the chapter content?	Y	S	N
3. At the end of a selection or chapter does the author review essential concepts?	Y	S	N
4. Are review sections, questions, and problems keyed to specific book sections so that students can readily review concepts they did not originally understand?	Y	S	N
5. Does the author highlight (underline, bold print, italics) key concepts and vocabulary within the text?	Y	S	N

D. Content within Chapters

1. Does the author provide clear definitions of unfamiliar vocabulary and new concepts?	Y	S	N
2. Does the author introduce a new concept with enough good examples so that the concept is comprehensible?	Y	S	N

3. In introducing a new concept, does the author use motivational devices (practical examples, cartoons, etc.) to make the reading interesting? Y S N
4. When appropriate, does the author provide practical applications of mathematical concepts? Y S N
5. Are the mathematical exercises sufficient? Y S N
6. Do exercises progress from simpler to more difficult problems? Y S N

E. Sentence Level

1. Are sentences consistently short and clear? Y S N
2. Are most verbs in the active voice? Y S N
3. Does the author use explicit signals to indicate sequencing of ideas (*first, second, third*)? Y S N
4. Does the author use emphasis words to indicate important concepts (*most of all, a key feature, a significant factor*)? Y S N
5. Does the author use explicit signals to indicate comparisons (*but, however, on the other hand*)? Y S N
6. Does the author use explicit signals for illustration (*for example, such as*)? Y S N
7. Does the author use explicit signals for conclusions (*therefore, as a result*)? Y S N

F. Concept Development

1. Are new concepts linked to a student's prior knowledge? Y S N
2. Are concepts first defined, then followed by clear examples? Y S N
3. Are concepts explained clearly with sufficient elaboration? Y S N

G. Vocabulary Density

1. For the evaluation of vocabulary density, count out two 100-word samples. For each selection circle all vocabulary which might be unfamiliar to some or most of your students. Then count the number of circled words and record below. Remember, mathematical notations and formulas are classified as vocabulary.

Number of Unfamiliar Words
and Symbols

Selection 1. ______________________________

Selection 2. ______________________________

If the total for either selection is five or more words, the vocabulary demands will very likely create some problems for your students.

H. Context Clues

From the two selections above, analyze the circled words to determine how they are introduced and reinforced in the selection. Examine how the author uses context to develop understandings of these words or symbols and evaluate whether or not they are explained in a way that students will understand. (See the pages following this checklist for an explanation of contextual clues.)

	Selection 1	Selection 2
Total number of unfamiliar words in selection		
Number of words developed through context		

Types of Contextual Clues Used in Text

Number of direct definitions with examples		
Number of direct definition alone		
Number examples alone		
Number of restatement		
Number of inferences		
Number of other		

Vocabulary Density and Development: Mathematics

Mathematics texts contain many words and symbols foreign to a student's listening and speaking vocabularies. In fact, one can readily conclude that the vocabulary demands of mathematics are the most challenging of any discipline.

As a mathematics teacher, it is important to be aware of how vocabulary is structured and developed within your text. With this awareness, you will be able to help students learn to use this structure to become more independent in learning mathematics vocabulary.

Mathematics has a large technical vocabulary which students must understand to master the discipline, as well as words specific to mathematics (hypotenuse, polynomial). There are a number of common words which take on a special significance when used in mathematical problems (*and, of, product*). In addition, there is symbolic or notational vocabulary which a student must master ($<$, $=$). The frequency of all these technical vocabularies within a single section of a mathematics text has a profound affect on readability.

In addition to the frequency of special terms, readability is also influenced by the presence or absence of explanations clarifying unfamiliar terminology. These explanations or contextual clues vary by clarity and type. Some are far easier for students to understand than others. The ideal situation is one where the author provides a direct explanation of a new term and then clarifies it further through examples. The direct definition should be stated in terms that students can readily understand, and the examples should be obvious illustrations of the concept. Having just examples or just a direct definition is generally not as effective as a combination. The most difficult situation occurs when an author makes no attempt to define a word or provides a confusing explanation.

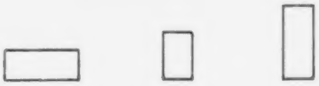
Contextual Clues in Mathematics

The following samples progress from contextual clues that are easier to more difficult. Direct definitions clarified through clear examples are usually the easiest type of contextual clues. Next in line are explanations containing only examples or only a direct statement of the meaning of the term. Contextual clues of restatement also fall within this moderately easy range. More difficult contextual clues use inference, where the author presents some very indirect explanatory information. Finally, the most difficult situation occurs when the author makes no attempt to explain an unfamiliar term. Samples of each type are presented below.

Direct Definition with Examples

Contextual clues classified as **direct definitions,** typically have the word being taught as the subject of the sentence. The subject is usually followed by a linking verb and definition. Examples usually follow or precede the definition statement.

1. The *mean* of a set of numbers is the average. It is found by adding the numbers and dividing the result by the number of numbers added. For example, 3 is the mean of the following numbers: 3, 3, 4, 2, because 3 + 3 + 4 + 2 = 12 and 12/4 = 3.



2. These are all *rectangles.* A rectangle is a 4-sided polygon that has four right angles, and its opposite sides are congruent.
3. The *intersection of two sets* is the set of all elements common to both sets.
4. If a sequence has a last term it is called a *finite sequence.*

Examples

If the author explains a concept predominantly through the use of examples, the context clue is classified as **example.**

1. x, x+1, x+2 represent *consecutive integers* for each integer x.
2. The *Distributive Property* is a(b+c) = ab + ac.

Restatement

Context clues are classified as **restatement** if the word being taught is explained through an appositive or some "direct signaling" by the author. Students must learn to attend to punctuation and signal words indicating an explanation. Some examples of "signal words" are *that is, or, appear as, in other words.*

1. The *mean,* or in other words, the arithmetic average, is a measure of central tendency.
2. This is a *coordinate,* or ordered pair.

Inference

Contextual clues classified as **inferences** are those where the author does not use any signal words indicating that the concept is being explained. In addition, the meaning of the term is not directly stated.

1. Triangles ABC and DEF are *congruent.* Imagine fitting triangle ABC exactly into triangle DEF so that sides and angles fit.
2. If a and b are real numbers, (a,b) is a *coordinate.*

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Part 4: Teaching Text Organization

The first step in a content reading approach to instruction is to help your students use **text organization** to aid their comprehension. Students need to understand that the author has a system for imparting content, even if the system is not particularly effective. Teaching students how their text is organized for conceptual development helps them organize information for learning.

We recommend that text organization instruction progress from teacher demonstration and discussion to guided practice and finally to independent application. This progression is used to organize the instructional activities described in this section.

Strategies for Teaching Text Organization

Direct Instruction

1. Select a selection from your text. Photocopy the selection so that students can underline and make marginal notes. Make yourself a transparency of the selection. Then read the selection through, paragraph by paragraph, and "think aloud" your own strategies for reading the selection. Have students write down your think-alouds in the margin. (See Exhibit 2.6 containing a sample biology text selection and Teacher think-alouds.)
2. After completing the demonstration, have students summarize the strategies that you used for reading the text. Have students write their own summary of strategies.
3. Do several such demonstrations until you feel that students understand the strategies that you use.

Guided Practice

1. Have students read a section of their assignment. Lead a discussion focusing on how the author has helped or hindered their comprehension of the selection.
2. Divide students into groups. Have each group responsible for demonstrating how to read the selection.
3. Have students read the introduction, bold print topics, and conclusion. From this information alone, have them predict and outline the probable text information. Then have them read the selection and revise their outlines.
4. Have them "map" the organization of the chapter. (The next chapter contains an in depth discussion of mapping.)
5. Create teacher-made guides to familiarize students with the organization of their texts. (See examples in the next section of this topic.)
6. Have your students take on the role of a textbook adoption committee, and write an evaluation of a chapter. The following is an example of a possible outline for this written evaluation:

   Students read a chapter in their text and write a critique of the chapter. They are to write a paragraph about each of the following areas:

   a. Examine the introduction and summary of the chapter. Does the introduction tell you what you are going to learn in the chapter? Does the author follow through by developing the ideas? Does the summary focus on essential ideas covered in the chapter?
   b. Examine paragraphs in the body of the chapter. Are main ideas developed directly in the paragraphs? Is the author consistent in the way main points are developed?
   c. How are new concepts presented? Are they noted in bold print? How well are new ideas explained?
   d. Review the chapter's pictures and graphs. Are there enough? Do they illustrate the ideas of the chapter? Are visuals placed appropriately on the page? Does the author direct your attention to visuals?

7. Xerox copies of a chapter. Have students become editors and revise the chapter so that it is more comprehensible.
8. Once students begin to use the author's structure successfully to aid their comprehension, continue to focus students' attention on the organization of their text through discussion and reteaching. This is particularly true when text organization varies from chapter to chapter.
9. Include evaluations of text organization as part of examinations. Xerox a page or two from your text and have your students, through marginal notations, underlines, and essays, describe how they use the author's organization to comprehend and to learn from their text.

Exhibit 2.6

Teacher Think-Alouds

The title of this chapter is the Web of Life. What does this mean? After I look at the pictures and some of the bold print title and vocabulary, I might have a better idea of what I am going to learn in this chapter.

The Web of Life

In the introduction, the author defines words clearly. Right after presenting a word in bold print, there is a pronunciation key and a definition. Notice the author is consistent. Each of the three new vocabulary words are introduced in the same way. The last sentence in the introduction tells exactly what I will be learning in this chapter.

Notice, the Guidepost, or question that focuses what I should learn in this section. I should be able to answer this question after I read this section.

You are one of many **organisms** (OR guh niz umz)—living things—in the web of life. Because all organisms depend on other organisms for their source of energy and matter, there are many connections in this web. All organisms need energy to live, to grow, and to reproduce. All organisms need matter to make up their bodies. In the web of life there are many direct connections between organisms that eat each other. There also are countless, indirect relationships between any individual and the organisms that affect its life. All this activity happens in the **biosphere** (BY oh sfir), the living part of the world. The biosphere exists in a delicate balance, which may change from day to day or year to year, but which remains relatively stable for long periods of time. The people who study the biosphere are **biologists** (by OL uh jists), scientists who study living things. In this chapter we will introduce the biosphere and the bases for all living things—matter and energy.

Guidepost: Why is it difficult to study an organism apart from its environment?

1.1 Organisms Interact with the Organisms They Eat

A brightly colored grasshopper sits on a young plant and chews a leaf. The grasshopper is blue, red, and black, and it is as long as your fingernail. After several minutes the leaf is completely eaten. The grasshopper jumps toward another plant, but lands on a sticky thread instead. The thread is just one of many that are carefully woven together into a large, shiny trap—a web. As the grasshopper struggles to free itself, more threads stick to it. With each movement, the grasshopper sends a vibration from thread to thread and finally to the maker of the trap. In

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the blink of an eye, a large brown and yellow spider seizes the grasshopper and kills it with poison injected from its fangs. Digestive fluid from the spider's mouth liquefies the grasshopper's body, and the spider sucks up the resulting broth. Later, the spider drops the remains of the grasshopper on the ground and begins to wait for another insect.

This story is repeated every day all around the world. An insect eats a plant, and a spider eats the insect. Like the threads of the web, these three organisms are connected to each other in the web of life. They are connected to each other by their shared need for energy to grow and to reproduce. Some animals eat plants to get their energy, and some animals eat other animals. Plants, such as the poppies in figure 1.3, get their energy from the sun and make their own food. No matter where the energy comes from, without it an organism soon dies. If grasshoppers eat all the leaves of the young plant, the plant can no longer make its own food, and it dies. If the spider web is torn by a falling twig, the web must be repaired, or the trap can no longer catch food for the spider. The link to the supply of energy cannot be broken.

The author explains the web of life through an example of a plant, grasshopper and spider. The pictures provide a vivid image of the interrelationships. After the example, the author gives me an idea of the complexity of these interrelationships. The author seems to move from examples to explanations.

Many things can change the relationships between the plant, the grasshopper, and the spider. Caterpillars may eat the plant, which means less food for the grasshoppers. Without enough rain, the plant may die before it can reproduce or provide food for an animal. The spider may catch flies and moths as well as grasshoppers in its trap. A bird may eat the grasshopper, and it may even eat the spider and the caterpillar. The spider web has many threads, and in the web of life many organisms are connected to each other. The more closely we view the world, the more complex this web becomes.

We have seen how plants and animals interact within the web of life. The nonliving parts of the world such as temperature, sunlight, and rainfall influence the growth of plants and animals. The study of the living and nonliving parts of the environment and how they affect organisms is called **ecology** (ee KOL uh jee). Scientists who study ecology are **ecologists** (ee KOL uh jists). Ecology is only one aspect of biology. In this text, we will study many areas of biology, but we will focus on ecology. Let us begin our study by observing some organisms in investigation 1.1

Finally, in the last paragraph the author introduces another concept. Again the author uses bold print, a pronunciation key and a direct definition. The author uses a consistent method to introduce new vocabulary.

Investigation 1.1 THE POWERS OF OBSERVATION

Introduction

There are many ways of exploring the world around us. In this investigation you will begin your exploration by doing some of the things scientists do: observing, reporting, and verifying observations.

Materials (per class)

labeled specimens of organisms
hand lens or stereomicroscope
millimeter rulers

Procedure

1. Located around the room are groups of organisms or parts of organisms. Each group contains 4 specimens of an organism. A **specimen** is a sample individual or, in the case of large plants, a characteristic part (a leaf, for example). Each group is labeled with the name of the organism and a number. Each specimen is labeled with a letter.

2. Work in teams of 2 to 4. Each team will begin with a different group of specimens. You will have approximately 10 minutes to observe and describe the specimens.
3. Select one person to take notes. Observe the 4 specimens and make notes on differences you see among the specimens. Take measurements, if appropriate. Remember, the differences must be in the organisms, not the containers they are in.
4. When your team has decided on the differences among the 4 specimens, choose 1 specimen and, on a separate sheet of paper, write a description of it. Make this description as complete as possible. Other teams will use it to try to pick out which of the specimens you were describing. Do not indicate the letter of the specimen on your description sheet. Write this information (group number and letter of specimen described) on a slip of paper and give it to your teacher.
5. When your teacher signals that the time is up, place your team description with the group of specimens so that other teams can use it for step 6.
6. When your teacher tells you, move to the group with the next highest number. The group with the highest number will go to group 1. You will have several minutes to observe each group. Select another team member to take notes. Read the description and decide as a team which of the specimens it describes.
7. Make up a chart with these headings:

Group Number	Specimen Fitting Description

Record the letter of the specimen on your chart.

Student Guides to Text Organization

This section consists of several examples of worksheets designed to help students become aware of the organization of their text. Worksheets should not be used as seatwork assignments unless students have first had some direct instruction in text organization.

Exhibit 2.7

Science Content Area Student Guide

Textbook Inventory: Biology

1. Examine the title of your book. What do you think the authors mean by an ecological approach?
2. What is the copyright date of your book?
3. In the sciences, why is it particularly important to learn from a text which has a recent copyright?
4. How many authors worked on the revision of this text?________ What effects might so many authors have on the writing of the text?
5. Find the Table of Contents.

   How many sections are included in your textbook? ________

   What is the topic of the first section? ________

   How many chapters are contained in the first section? ________
6. Now turn to the first chapter, and leaf through the pages until you come to the end of the chapter. It is important to understand how a chapter is organized before you begin reading.

   On page 3, the author has a section entitled, "Your Guideposts." Read through the questions specified here. How might these questions help you understand the content of the chapter?

   ____

   ____

   What is the title of the next section on page 3? Now notice the subtitle on page 4. How has the author varied the type of print to let you know the essential points of the chapter and how they are organized?

   ____

   ____

   Note also on page 6 that there is an additional section entitled Investigation 1.1, "Looking at Life." Quickly read through this section. Why do you think the authors include investigation sections throughout this book?

   ____

   ____
7. Look at the right hand margin on page 11. What type of information is included in the margin?

   ____

   ____

   How might you use this information to help you comprehend the text?

8. On page 13, the author has included a set of questions over the preceding reading. How could you use these questions to help you comprehend and remember what you read?

9. In the Table of Contents, you find some Appendices. Quickly skim the information presented in Appendix I, pages 729–732.

How might the information presented in Appendix I help you get off to a good start both in the laboratory and in writing laboratory reports?

10. Finally, locate the Index in your text. On what pages might you find information about ammonium?

11. Read pages 10–11. What has the author done to help you understand the main idea?

What are the main points in this section?

Exhibit 2.8

Social Studies Content Area Student Guide

Student Guide to Text Organization: History

Survey the Chapter

1. Examine the title of the chapter. Read the introduction, page 498.
2. What is the author going to cover in this chapter? Write a question expressing the main idea of the chapter.

   ____

   ____

3. How is the author going to develop the main idea of the chapter? What are the central topics to be discussed? Before answering these questions, examine the major topics of the chapter. Check to see if the author has summarized his arguments at the end of the chapter.

   Based on this information, write from four to five questions which you think the author will answer in the chapter. Remember the questions should reflect back to the central topic (number 2).

   A. ____

   B. ____

   C. ____

   D. ____

   E. ____

4. Now look at just the first section, paes 499–501. Quickly re-survey this section. Look at the information in the chapter headings, introduction, and summary. Formulate several reading purposes specific to this section. Write them in the form of questions.

   A. ____

   B. ____

   C. ____

5. As you read, underline and enumerate (number) the "Reasons behind the nation's growing interest in overseas expansion." Be sure to underline selectively. Mark with asterisks (*) any ideas which you feel are particularly important. Notice any clue words the author uses (*the most important idea is, the concluding fact, another reason is*). These clue words will help you comprehend the selection. When main ideas are not clearly stated, jot your own in the margins.

6. After reading the section, look back at the purposes which you specified in number 4. How appropriate were your purposes to the content of the text? Revise purposes as needed. Can you answer your own purpose questions? Try it.
7. Get a copy of the underlined example for this section. Now compare what you have underlined with the example.

   Did you underline key words and phrases rather than complete sentences?

   Did you find about seven reasons supporting the main idea of this selection?

   Did you enumerate these reasons?
8. Examine the summary of this section (see page 501). How well does the summary reflect the reasons that you enumerated? Rewrite the summary to make it more complete. Use the space below.

Exhibit 2.9

English Content Area Student Guide

Text Assessment

Name ________________________

Period ________________________

1. What is the name of the text? ________________________
2. Is the book written by one person? ________ Who did write the book? ________________
3. How many sections are in the book? ________________________

   How do the authors make a distinction between these sections? ________________
4. How many chapters are in the first section? ________________________

   List the titles of three of the chapters which you think will be most helpful to you: ____________

   ____

   ____

   ____
5. Turn to page 55. Explain what is meant by a topic sentence. ________________

   ____
6. Turn to page 130. What three parts does a good composition contain? ________________

   ____

   ____
7. In chapter 7, what are the two types of letters you may write? ________________

   ____
8. Now turn to chapter 9, page 210. How are nonfiction books classified in the library? ____________

   ____
9. In the red section on page 25, what is meant by definite and indefinite articles? ____________

   ____

   ____

10. From the red section on page 50, tell what are the four types of sentences: ______

11. What is meant by a run-on sentence? ______

12. How many rules are there for uses of a comma? (Part 11.0) ______

13. On what pages are the rules found for spelling: ______

14. List three suggestions to follow for spelling: ______

15. List five words from the Index that are not familiar to you: ______

16. Turn to the page where one of these words is located, and give a definition: ______

17. Turn to the "Handbook" pages. Are they in the front or the back of the book? ______

If you needed to find information about each of the following, on what page would you look?

a. Subject-verb agreement ______

b. Sentence fragments ______

c. Quotation mark usage ______

d. When to use "good" or "well" ______

Exhibit 2.10

Mathematics Content Area Student Guide

Student Guide to Text Organization: General Mathematics

Fundamentals of Mathematics

1. Examine the title of your book. What do you think the authors mean by *Fundamentals of Mathematics?*
2. What is the copyright date of your book? ______________________
3. Look at the table of contents.
   How many units (noted in red print) are contained in your text?
4. What is the title of the first unit in your text?

   ____
5. Turn to the first unit, which begins on page 1. This page provides a very good example of how the author has organized the text.
   A. What are the two main points that the author is going to present on this page (noted in black bold print)?

   ____

   ____

   B. In addition to bold print, what other clue has the author provided to let you know that these are main ideas? ______________________

   C. Now look back at the Table of Contents. Do the main points presented in bold print match those presented in the Table of Contents? Yes No

   D. Now read the first paragraph on page 1. Find the word "number" and "numeral." Why has the author written these words in italics? ______________________

   Why might it be important to attend very carefully to the words and phrases printed in italics?

   ____

   E. On page one, examine the information contained in the pink box. Why do you think the author has set aside information in boxes? ______________________

   ____

   F. Notice that after each main topic there is a paragraph of explanation, followed by a set of exercises. Leaf through pages 1–10. Examine each section, from 1–1 to 1–10, covering null set, finite set, and infinite set.

   Is the organization of the information presented in each of the ten sections similar?

   Below, briefly describe how the author organized the information in each section. ______________________

   ____

6. What is presented on page 16?

Notice that after each question are two numbers separated by a dash (1-1). What does 1-1 mean?

____

How might you use this information when you study for examinations? ____________________

____

Look at question #5. On what page could you find information to help you answer this question?

7. Turn back to the Table of Contents.

What information will you find on page 551? ____________________

What information is on pages 551-553? ____________________

8. Finally, turn to the Index, which begins on page 554. On what page could you find information on:

Acute triangles ____________________

Consumer income ____________________

Gold ____________________

Summary

The backbone of instruction in most content classrooms is the textbook. We may not agree with this emphasis, but the text is a fact of life in most content classrooms. The issue for us is how we can make our text the best possible learning tool for our students.

Thus, the first step is to familiarize ourselves and our students with the author's craft. The first three sections of this chapter focused on text evaluation. We became editors and examined both the external components (bold print, visuals) and internal components (writing style) of our text. The text assessment checklists and explanations led us through this evaluation.

Next, we examined ways to empower our students with similar knowledge. When students understand the methods the author uses to explain content, they gain more control of their own learning. They begin to pay attention to bold print headings, visuals, and questions to guide their comprehension and begin untangling the author's system of developing main ideas. Students must become aware of this process before they can succeed in imparting their own organization to content. Once students understand the "craft" of their text, they can initiate active approaches to organize the material for learning.

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CHAPTER 3

Informal Assessment Procedures

As a teacher of a content area, it is important to know the reading, studying, and writing skills that your students bring to the learning situation. To make this determination, we recommend administering informal reading and study skill assessments during the first few weeks of the school year. Such information will help you determine the reading, writing, and studying strategies your students need to learn as part of content instruction.

In this chapter we provide several different options for assessment, all of which are developed with text material used in the classroom. These include study skills inventories, informal learning inventories, and cloze assessments.

Part 1: Study Skills Inventory

During the first week of school, consider giving your students the enclosed **study skills inventory,** or your adaptation of the inventory (Exhibit 3.1). Feel free to revise the inventory as needed to fit your particular teaching situation.

Then analyze the results. Is there a correlation between individual scores and the tests that you administer over content? It is always interesting to examine the inventory responses of your most and least successful students. Good students have better systems of studying than poor students, and that fact should be reflected in the inventory responses. Note the response differences that separate your good and poor students, and share these results with your classes so that poor students become more aware of strategies that successful students use to read and learn content information.

At the end of the semester or year, use the same inventory administered at the beginning of the term as a post-assessment. Have students compare their own performances on the pre-test and post-test, and note areas of greatest change.

Exhibit 3.1

Study Skills Inventory

Name ______________________________ Class ______________________________

Teacher ______________________________ Today's Date ______________________________

For each statement below, indicate the extent that you agree or disagree by marking the appropriate answer.

A = Always, U = Usually, S = Sometimes, R = Rarely, N = Not at all.

1. I learn a lot in this class.	A	U	S	R	N
2. I can't put a novel down until I have read the entire book.	A	U	S	R	N
3. I have the interest and curiosity to do more schoolwork than just what is assigned.	A	U	S	R	N
4. It is fairly easy for me to learn from the class text.	A	U	S	R	N
5. The information presented in this class will be important to me after I graduate from high school.	A	U	S	R	N
6. I enjoy learning in this class.	A	U	S	R	N
7. Before I read assignments, I try to get a general idea of what the chapter is about by looking at chapter introductions, summaries, and pictures.	A	U	S	R	N
8. Before reading an assignment in this class, I have an idea of what I would like to know from my reading.	A	U	S	R	N
9. Before reading in this class, I think about all the information I already know about the topic.	A	U	S	R	N
10. Before reading, I predict either in my head or on paper what the assignment will be about.	A	U	S	R	N
11. I take notes about the reading assignments in this class.	A	U	S	R	N

Check which type(s) of notetaking procedures you use:

a) two-column notes ________
b) mapping ________
c) problem/solution ________
d) opinion/proof ________
e) power notes ________
f) outline ________
g) journal ________
h) three or more columns ________

12. I write summaries of the information in the class text or materials.	A	U	S	R	N
13. I make up study questions from my reading assignments and then practice answering these questions.	A	U	S	R	N

14. I use organizational clues in my class text (titles, introductory statements and paragraphs, bold print, italicized words, summary statements) to help me understand the reading assignment. A U S R N

15. I exchange ideas and comments about assignments with other students who read the same assignments. A U S R N

16. In this class, we answer questions found in the text or do short answer worksheets over the material in the text. A U S R N

17. In this class, it is most important that I know the details or facts such as the names of people, places, and dates. A U S R N

18. When I come across a word in a reading assignment that I do not know, I try to figure out the meaning of the word from the way it is used in the material. A U S R N

19. During study time at home or in class, I review notes taken from reading assignments. A U S R N

20. I have trouble taking notes from films and speakers. A U S R N

21. Writing about information, concepts, or my opinions in class helps me learn. A U S R N

22. After reading an assignment, I can remember the main ideas presented in the assignment. A U S R N

23. To help me remember difficult vocabulary or concepts, I try to relate the information to myself or people and places with which I am familiar. A U S R N

24. I enjoy the writing I do for this class. A U S R N

Check the writing activities you have used in this class:
a) RAFT ______________________
b) Paragraph or page summaries ______________________
c) One sentence summaries ______________________
d) Journals ______________________

25. In this class, it helps me when other students read and comment on the papers that I write. A U S R N

Part 2: Informal Learning Inventory

The **informal learning inventory** is a procedure for determining how well individual students can read, study, remember, and write about course content. These assessments are comprehensive and provide invaluable information about how students learn from their reading.

Selecting the Reading Material

1. If you plan to use your assessment as a pre- and post-test, choose a reading selection which you are not going to assign students as part of your course.
2. Choose a 3-to-5 page selection from your text.
3. Make sure the selection is representative, both structurally and conceptually, of your text. Evaluating students with selections that are considerably easier or harder than those typical of your text will not provide a very valid assessment.
4. Photocopy the selection.

Procedure

1. Before students begin reading, take a moment to write the title of the selection on the board and have students brainstorm about what they already know about the topic and what they think they will learn from their reading. Add background information essential to understanding the selection. Next, instruct students to read and study the selection.
2. Tell the students to write directly on the selection or take notes if they wish. They are to do whatever they normally do to learn the information.
3. If one of your goals is to determine how well your students underline and take notes, instruct students to do one or both tasks as they read. Have students turn in their notes and underlines for evaluation.
4. Give the students a class period to complete their reading and studying.
5. Collect the selections and any notes students may have taken. Students are not to read and study the selection any more.
6. The next day, test the students over the material. Short essay tests will provide more diagnostic information than multiple choice tests.
7. Assign students to write a paragraph summarizing the most important information in the selection. This provides an excellent writing sample and an excellent assessment of reading comprehension and retention.
8. Finally, have students write a paragraph describing what they did to study the material.

Evaluation

1. Score tests.
2. Determine average score. If the average score is low, your text (or at least this text selection) is too difficult for most of your students.
3. Examine the tests, summary paragraphs, and study skills paragraphs of students falling below the average score.

   Use the following questions to guide your evaluation of these students:
   a. How did they perform with main idea questions?
   b. Did they have difficulty understanding new vocabulary defined through context?

c. How well did they summarize the selection?
    1. Did the summary contain a main-idea statement specifying the overall topic of the selection?
    2. Are the main ideas summarized in the summary?
    3. Are there excessive mechanical and sentence errors?

d. What study strategies did the student use? Did he/she read and reread the material, or did the student use more active learning strategies?

4. Examine the underlining and note-taking portions of the test.

   Questions to guide your evaluation:
   a. Was the underlining selective?
   b. Did students underline key ideas?
   c. Are main ideas marked with asterisks or some other notation?
   d. Are notes organized according to main ideas and details?
   e. Are notes written with abbreviations and phrases rather than complete sentences?

5. Examine the tests of the top five and the lowest five students. Determine the differences in study strategies and types of performance between the two groups. Talk about the differences with your class. Try to arrive at some conclusions about the differences between the groups.

6. Use the information to plan the reading and study skills strategies that you implement as part of content instruction.

Part 3: Cloze Assessments

Cloze is another informal approach for measuring reading performance. Cloze tests are elegant in their simplicity, although they do not provide as much information as informal learning inventories.

In a cloze, words are systematically deleted from a text selection. Students then read and supply the words deleted. The degree to which the reader successfully replaces the exact words that have been deleted is an index of the student's ability to read the material. Cloze assessments measure how familiar the reader is with the language and content of the selection. In effect, they provide an indication of the closeness of the reader's background and the author's language.

In addition to measuring students' abilities to read and comprehend the material, cloze assessments also provide a system for measuring the difficulty of text. This information can be invaluable, particularly when considering new text adoptions. Having students complete four or five cloze passages from several different chapters provides a good indication of text readability. If the average class performance is low on the assessments, the text may not be a very effective learning tool.

Passage Selection and Preparation

The passage you select is of utmost importance. It must be representative of the book from which it is a part.

1. Select passages that students have not yet read and that are about 300 words in length.

2. Leave the first several sentences, or better yet, the first paragraph, intact. Beginning with the second paragraph, delete every fifth word until there are fifty deletions. Replace each deletion with a blank fifteen spaces long.

3. Finish the sentence in which the fiftieth deletion occurs. Type at least one more sentence intact. If the final sentence occurs at the beginning or the middle of the final paragraph, type the rest of the paragraph intact.

4. A minimum of three passages should be used. Also prepare a practice passage.

Exhibit 3.2 presents a sample cloze test.

Test Administration

1. Familiarize your students with the cloze task before administering the test passages. Let them work on short passages. You may even let them work in pairs or teams.
2. Students are not to use any books or materials during the test.
3. Provide the students with the necessary background knowledge before they begin to read. Talk briefly about the topic of the selection and have the students generate some purposes for reading.
4. Administer the directions:
   a. "Fill in the blanks in the following selections with the word that has been left out. Try to supply the exact word the author has used. Only one word has been deleted from each blank. You will have as much time as necessary to complete the task."
   b. Tell the students to use sentence context to figure out the deleted word.
   c. Students very often get only from 30 to 40% correct on a cloze assessment. Since few students are accustomed to doing so poorly on tests, anxiety may interfere with their performance. Therefore, make sure students are aware that cloze examinations are difficult and that they are not expected to know all of the correct deletions.

Test Scoring and Interpretation

1. The most valid procedure for scoring is to count only exact replacements. Do not give credit for synonyms for reasons based on both experimental evidence and practical considerations (Pikulski & Tobin, 1982). Research comparing the differences between verbatim and synonym replacements indicates that students rank similarly using either method of scoring. Although scores are higher when giving credit for synonyms, the overall student ranking from high to low does not change. Giving credit for synonyms takes far longer to score, and the extra effort simply does not result in more accurate evaluations. Therefore, score only exact replacements as correct. It saves time.
2. Give two points for each correct item on a cloze having fifty deletions.
3. For each student, average the performance for the test passages. (Do not count performance on practice passages.) If you are evaluating students with three different selections, score each passage separately and then average the three scores.
4. Use the table below as a guide for test interpretation (Pikulski & Tobin, 1982*):

If the average score is:	*The material is probably:*
50% or higher	Easy for this student; student can read the material with little teacher assistance; the material should be appropriate for homework assignments and other types of independent projects.
30% to 50%	Can use material for instructional purposes; some guidance necessary for reading the material.
30% and lower	Material too challenging; almost no potential for success; material should be avoided.

---

*From John Pikulski and Aileen Tobin, "The Cloze Procedure as an Informal Assessment Technique" in J. Pikulski and T. Shanahan (eds.) *Approaches to the Informal Evaluation of Reading*. Newark: from International Reading Association.

Exhibit 3.2

Sample Cloze Test

The Spanish Armada

(Based on a selection from *The Rise of the American Nation* by Todd, Lewis and Curtis, 1977).

The Spanish Armada, set sail from Spain. Soon rumors of war spread across Europe. On Saturday, July 30th, the rumors became reality as the Armada entered into the English Channel

Attack at Sea

On following day, the __________ (1) fleet prepared to attack __________ (2) British. The British __________(3) were much smaller than __________ (4) Spanish. Yet, the British__________ (5) were faster, with better __________ (6) sailors and accurate gunners. __________ (7) Spanish fleet sailed magnificently __________ (8) the channel. They kept __________ (9) formation and all the __________ (10) and crews were confident __________ (11) victory. However, the British __________ (12) to move in and __________ (13) of range of the __________ (14) slow-moving Spanish ships. __________ (15) then retreated beyond the __________ (16) of Spanish artillery. The __________ (17) were angry. They banished __________ (18) swords and shouted at ______ (19) English, daring them to __________ (20) closer and enter into __________ (21).

The English were smarter. __________ (22) two to one and __________ , (23) they had no intention __________ (24) confronting a direct attack __________ (25) the Spanish. The battle __________ (26) for about six days. __________ (27) was difficult and intense.

__________ , (28) the Spanish fleet anchored __________ (29) the port of Calais (kal'Ay) ______ (30) the coast of France. __________ (31) British ships waited just __________ (32) the harbor opening for __________ (33) Spaniards to move out __________ (34) continue the battle.

But __________ (35) Spanish leader was in __________ (36) hurry. England lay only __________ (37) miles (32.2 kilometers) away across __________ (38) channel. His ships were __________ (39) in fighting order, and __________ (40) felt confident of sure __________ (41). Destiny proved differently.

Disaster for the Spaniards

On __________ (42) evening, August 7, the __________ (43) sent several old ships __________ (44) full speed toward the __________ (45) fleet waiting in Calais __________ (46). When the ships reached __________ (47) mouth of the harbor, __________ (48) English sailors set them on __________ (49), climbed into small boats, __________ (50) went back to their own ships.

The Spaniards fell for the British trick. They were terrified of the fire ships coming toward them. Everyone thought that the burning vessels contained explosives. The Spanish admiral ordered his ships to escape from the harbor. They left in confusion and disorder.

The English fleet waited and then began to fire on the fleet. Most of the Spanish ships were destroyed.

Answers for sample cloze test:

1. English
2. the
3. ships
4. the
5. ships
6. trained
7. the
8. up
9. perfect
10. officers
11. of
12. began
13. out
14. clumsy
15. they
16. range
17. Spaniards
18. their
19. the
20. come
21. battle
22. outnumbered
23. outgunned
24. of
25. from
26. lasted
27. fighting
28. Finally
29. in
30. on
31. The
32. outside
33. the
34. and
35. the
36. no
37. 20
38. the
39. still
40. he
41. victory
42. Sunday
43. English
44. under
45. Spanish
46. harbor
47. the
48. the
49. afire
50. and

Summary

In this chapter we focused on three ways to evaluate students through informal assessments. The goal of each is somewhat different. If your goal is general information about the knowledge your students have of study strategies, consider administering a study skills inventory. The inventory provides valuable insight about various approaches to reading and studying and is useful as a pre- and post-assessment. By administering the inventory at the beginning and end of the year, students can examine their own development as learners.

If you want a thorough understanding of how your students function with reading assignments, consider developing and administering an informal learning inventory. This approach measures comprehension, notetaking, underlining, and summarizing behaviors with materials used in your content classroom. Such diagnostic information provides invaluable information about individual students, as well as information that can guide instructional planning.

The last procedure is the cloze assessment. While simple to administer and score, cloze assessments are not as thorough diagnostically. These assessments help determine the range of reading abilities within a class, but provide little information regarding your students' specific studying and writing skills. Nevertheless, cloze assessments can be useful as a first step in evaluating students.

Now that you understand the structure of your text and know ways to gain some initial knowledge of your students, our focus turns to instruction. The next chapters present many different instructional behaviors. We begin with a discussion of ways to develop students' background knowledge and their understanding of main ideas (Chapter 4). We then move to active approaches for organizing and writing about content information (Chapter 5). Chapter 6 presents ideas for teaching vocabulary, and Chapter 7 presents a general instructional model for teaching content reading. This model integrates the various strategies into a logical instructional flow.

CHAPTER 4

Generating Background Knowledge and Understanding Main Ideas

Using background knowledge and understanding main ideas are two skills fundamental to content learning. Background knowledge is the true basis of comprehension. The more students know about a topic, the more they will understand. The teacher plays a key role in helping students find ways to activate what they know so that they can integrate it with new information.

The first step is to determine the reader's knowledge about an upcoming topic. Always take time before reading begins to draw forth students' background knowledge through brainstorming. Once they let you know what they know, pre-teach additional key concepts essential for comprehending the assignment. Do not make reading assignments without taking a few moments for "frontloading." The final step is to make sure that students understand why these steps are essential for successful comprehension and why they must gear up for reading in order to learn on their own.

In addition to helping students use their background knowledge, we also need to provide specific instruction in discriminating between important and less important ideas. Given the large amount of information contained in content courses, selectivity is essential for learning and remembering.

In this chapter we present ideas for helping students use their background knowledge and their understanding of main points in their reading. Part One focuses on procedures for eliciting what students know about a topic, and Part Two contains main idea strategies.

Part 1: Background Knowledge

Preparing students to read an assignment involves three components. First, determine what students already know about the topic—their **background information.** Second, fill in conceptual "holes" by providing information that the students need in order to understand the selection, and third, show them how to make predictions about what they should learn from the selection.

Direct Instruction

1. List the title and/or key vocabulary from the reading assignment on the board.
2. Ask students to tell you all they know about the topic.
3. List their ideas on the board, or have them record ideas individually in their content journals (content journals are discussed in Chapter 5, Part 2).
4. Ask students to help you organize their listed ideas into meaningful groups.
5. Have students come up with labels for each group, and organize what they know under these labels.
6. After previewing the article, ask students to generate additional ideas about new information they will learn from reading the assignment. Have students volunteer categories of information they would expect the article to cover. List expected categories on the board.
7. Have students read and add details under each of the categories. Add additional groups as needed. When the students finish reading the article, have them discuss what they learned from their reading. Ask for additional information they might research about the topic.
8. Finally, lead a discussion that focuses on how this strategy helped students better understand and remember the reading assignment.

Guided Practice

1. Have students preview their assignment and make an outline of topic headings. From these headings have the students create two or three questions they think will be answered in the selection.
2. Before students read, have them read the introduction, bold print headings, and summary. Then tell them to close their books and write a brief paragraph predicting what they will learn from the selection.
3. On the board, list three or four key concepts that are covered in the reading assignment. Have students write about what they know. Discuss their ideas. Then have students read to learn more about the concepts.
4. Have students use a guide similar to the one in Exhibit 4.1 for brainstorming what they know before and after reading.

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Exhibit 4.1

Sample Background Pre-Reading Guide

What do you . . .

Know about the topic?	Think you will learn?	Know you learned from reading the assignment?

Adapted from Ogle, Donna, "K-W-L: A Teaching Model that Develops Active Reading of Expository Text," *The Reaching Teacher*, 39 (1986): 564–570.

5. Additional Ideas:
   a. Use a film to introduce ideas in a reading assignment.
   b. Bring in a guest lecturer to stimulate interest in the new ideas.
   c. Perform a laboratory experiment or demonstration to illustrate ideas.
   d. Before they read, have students research some ideas presented in the selection. For example, if the assignment is to begin reading the novel *To Kill a Mockingbird*, have students do research about the South during the 30's and racial prejudice during this period.

Part 2: Main Ideas

The **main idea strategies** presented in this section are sequential: teacher think-alouds, power thinking, selective underlining, paragraph summarizing, one-sentence summaries, reciprocal teaching, and, finally, conceptual mapping. Once students become competent in these various strategies, they can choose those that are most effective for their own unique learning styles.

Strategy 1: Teacher Think-Alouds

Begin instruction by modeling for students the thinking processes you use when reading for main ideas. Basically, this involves selecting, rejecting and paraphrasing in order to arrive at the central point of a paragraph or selection.

It is important in this discussion to teach students the difference between topics and main ideas. A topic is a one or two word description which tells what the paragraph or section is mostly about. The topic is usually presented in bold print as a subheading, or it might be repeated as the subject of one or more sentences in the selection. The main idea is the most important information about the topic. Main idea sentences often appear directly in paragraphs. The reading task is more challenging when main ideas are not explicitly stated within the paragraph.

Direct Instruction

1. Read a section of your text. Talk about how you determine the main points and details of the reading selection. Consider using the following steps in your think-alouds:

Step 1: What is this entire selection or paragraph about? What is the topic?
   1. Are there bold print topics and key vocabulary that can help me with this section?
   2. Are there any ideas that are repeated?

Step 2: Now that I know the topic of the selection, I am ready to determine what the most important information is about the topic. I am going to read the first paragraph and see if the author presents the main idea in one of the sentences. I am going to ask myself these questions:
   1. Is the main idea at the beginning of the paragraph? If not, I need to look for the main idea in other positions within the paragraph.
   2. Is the main idea located at the end of the paragraph? in the middle?

Step 3: What do I need to do if there is no stated main point? If there is no overall statement for the main idea, I need to come up with my own main idea for the selection. How do I do this?
   1. The first thing I do is come up with the topic of the paragraph.
   2. Next, I read through the sentences in the paragraph and make a list of all of the ideas or supporting details that tell about the topic.
   3. Then I think about the details and the topic and come up with a main idea.

2. Think-alouds will vary depending upon the nature of the material. After reading and "thinking-aloud" lead a discussion about the steps you used to come up with main points. Write the steps on a chart or some other permanent place for easy reference so that students can begin internalizing the process. The steps might look something like this:

   Step 1: Come up with a topic
   Step 2: Search for the main idea sentence in the paragraph. If there is no main idea statement go to Step 3.
   Step 3: Read through the sentences in the paragraph.
   Step 4: List details that tell about the topic.
   Step 5: Think of a main idea that tells about the topic and details.

3. Continue modeling and thinking aloud until your students seem to understand the steps used to extract and formulate main points.

Guided Practice

1. Use a well written selection from the text. Have students read through and discuss what they think are the topics and main ideas. Have students apply the steps outlined above in their analysis.
2. Have students talk about how they have applied the steps to come up with topics and main ideas.
3. Have students take turns teaching lessons to the class using the steps to come up with topics and main ideas.
4. Feel free to incorporate selective underlining strategy as part of this instruction.

For more information on strategies for teaching both the reading and composing of topics and main ideas, see (Aulls, Mark and Holt, William, *Act 1: Active Composing and Thinking,* Kendall/Hunt, 1988, Dubuque, Iowa).

Strategy 2: Power Thinking

The concept of **Power Thinking,** based on Power Writing (Miller, 1985; Sparks, 1982), does nothing more than match numbers with main ideas and details. Although the process is very simple, it effectively helps students differentiate between main ideas and details.

Direct Instruction

1. Provide your students with the following general information:

   Power 1: Main idea, thesis, general statement
   Power 2: Detail or support for Power 1
   Power 3: Detail or support for Power 2

2. Start working with Power Thinking by using words, rather than sentences or ideas. Show your students the following example:

   Power 1: Animals
     Power 2: Dog
       Power 3: German Shepherd
       Power 3: Collie
         Power 4: Lassie
     Power 2: Cat
       Power 3: Siamese
       Power 3: Calico

It is important to keep the structure parallel. A power 4 after *calico* would have to be the name of a calico cat. If another power 3 were to come after *dog,* it would have to be another breed.

Guided Practice

1. Pick a power 1 such as sports. Then have different students in the classroom give you powers 2, 3, and 4. Have them be the monitors, checking to see if each answer is parallel to those preceding it.
2. Write two power structures such as the following on the board:

```
1                   1
  2                   2
    3                   3
    3                   3
  2                   2
    3                   3
    3                   3
      4                   4
  2                   2
    3                   3
1                   1
```

   You provide the number 1s, such as TV shows and movies. Divide the class into teams and have them race to the board to fill in the different powers, in order, from top to bottom. The one at the end of each list is a restatement of the one at the top using different words, such as television programs and theater shows. Explain at the beginning that you have the right to veto any word if it is not parallel—or appropriate for school!
3. Write power 1s, 2s, and 3s on a number of 3″ × 5″ cards for several topics. Mix them up, and distribute to all or to a group of students. Have them shift their positions to sort themselves out, first into category groups and then into powers within each category.
4. Take a paragraph of text. Write down all of the separate bits of information it contains. Model for the students the way you can arrange the ideas into 1s, 2s, and 3s. Go through several more paragraphs, have students find the bits of information and then arrange them into 1s, 2s, and 3s. While this procedure is very similar to traditional outlining, it is considerably easier for the students and is a useful introduction to outlining.

Strategy 3: Mystery Pot

One very active approach to main idea instruction is to have students move sentences around to form well-organized paragraphs and essays. The **mystery pot** is one technique that encourages this skill.

Direct Instruction

1. Select consecutive paragraphs from the reading assignment. Begin with selections that are well written. Ideally, the first paragraph should be an introductory (or thesis) paragraph which provides the reader with the main points to be developed in subsequent paragraphs.
2. With younger children, begin with a single paragraph that contains a well-developed topic sentence and sentences containing supporting details. Cut the paragraph apart line by line, and put each slip in an envelope. Instruct students to organize the sentences into a well-written paragraph. Have students describe why they organized the sentences into a specific pattern. Remind students about power 1, 2, and 3 statements.
3. With a multi-paragraph selection, leave the first paragraph intact, but cut (line-by-line) the remaining paragraphs. Type the paragraphs with one sentence per line. Put all of these paragraphs into envelopes, enough for each student. Then have the students place the paragraphs and the individual sentences in the correct order, working either alone or in groups. Suggest that they first find sentences which contain power 1 ideas. Then organize the power 2 and 3 ideas appropriately.
4. Have students read their paragraphs to the class and explain the strategies they used to order their sentences.

Guided Practice

1. Have students list topics and subtopics from a chapter on separate cards. These are then placed in envelopes. As a post-reading activity, have students organize these into power 1, 2, and 3 hierarchies.
2. Have students write summary sentences describing the main events in a sequence (scientific experiments, mathematical problems, the plot of a short story). Cut the statements apart, and place the slips in envelopes. Use this exercise as a review.

Strategy 4: Selective Underlining

Underlining is a very powerful tool for processing main ideas—if students know how to underline properly. Students need explicit instruction to underline selectively and to organize highlighted information into main ideas and subordinate details.

Direct Instruction

1. Provide photocopies of a reading assignment to students, and make yourself a transparency of the selection. Also use materials such as weekly newspapers, workbooks, or old textbooks, which students can mark up.
2. Read through the selection, and demonstrate how to underline.
   a. Underline selectively.
   b. Highlight key words in a sentence, rather than the entire sentence.
   c. Note main points with numerals or asterisks, and enumerate details. Underlining with different colored pencils (blue for main idea, red for details) works well for some students.
   d. When main points are not explicit, generate your own main points and jot in margins.
3. Next, summarize with the students the steps involved in the process.
4. Continue modeling with other selections as needed.

Guided Practice

1. Provide students with opportunities in class to underline selectively. Provide feedback as needed. Have students explain their underlines to the class or to one another in editing groups.
2. Divide students into groups of two or three. Give each group a transparency of a selection from their reading assignment. Have each group selectively underline the material on the transparency. Each group then presents their underlines on the overhead for class discussion.

Strategy 5: Summarizing

Corresponding to reading for main ideas is the complementary process of writing well-formed paragraphs and summaries. **Summarizing**—through selecting, rejecting, and paraphrasing to arrive at main points—contains processes of both writing and reading. Therefore, instruction in both should occur simultaneously. As students learn to recognize main ideas in paragraphs, they should be practicing composing paragraphs that follow patterns similar to those found in their reading. **Summarizing** fosters these skills.

Before focusing on the instructional specifics, it is worth noting that some behavioral differences separate those who can and cannot summarize. According to Taylor (1984), who observed successful and unsuccessful summarizers, the less successful read over the assignment quickly and then began writing, spending little time rereading and thinking about the selection before they wrote. Those who succeeded, on the other hand, read the selection several times and spent far more time sketching out notes and thinking about the material. Poor summarizers did nothing observable in the way of note-taking and underlining to organize their thoughts. Moreover, successful summarizers continually monitored their progress as they composed, by checking back to the original to insure that their efforts represented the gist of the selection. Poor summarizers began writing with few, if any, referrals back to the original.

Discussing these different characteristics is a good way to begin direct instruction in summarizing.

Prerequisites to Summarizing

1. Students need to understand how their text is organized for main idea development.
    a. Review structural aids, such as titles, bold faced headings, vocabulary, discussion questions, and illustrations.
    b. Remind students to notice transition words that indicate main points.
    c. Note the presence of key vocabulary, repetition of ideas, and cueing phrases (*the main point is, the most important idea is*) which guide the reader in processing main ideas. Once students understand these organizational factors, they are ready for direct instruction in summarizing.

Direct Instruction

1. Begin with teacher modeling. Make predictions about what you think you will learn from the selection. Write down prediction questions which express probable main points on the board or overhead.
2. Read the selection. As you read, describe your thinking processes (see teacher think-alouds).
3. Reread, and take notes on the board. Include key words from topic sentences that express the main points of each paragraph. Include details as needed.
4. From these notes, organize the material for a summary.
5. Write your first draft.
6. Revise and rewrite.
7. Finally, working with the class, generate summerization rules which describe the process you have demonstrated. The rules may be similar to the following:
    a. The first sentence of the summary contains information about the main point of the selection.
    b. The next sentences contain main points from the paragraphs in the selection.
    c. The final sentence contains a restatement of the main point.
    d. The support sentences begin with transitional words such as *next, in addition,* and *moreover.*

Guided Practice

1. Begin with a well-written selection of the text from five to six paragraphs in length.
2. Do the entire sequence together, and discuss each step as you progress.
3. Write a group summary. Revise and rewrite as a group.
4. Within a day or two, follow exactly the same procedure, except have students write their own summaries. You may want three or four students to work together.
5. Share the summaries aloud, or have students write summaries on the overhead or on dittos for group reaction and discussion.
6. Continue similar exercises until students begin to succeed in writing summaries in class.
7. Begin assigning summaries as homework. Here we recommend one summary paragraph for each chapter section. For example, if a chapter contained five sections, students should write no more than a five-paragraph summary. Continue to read summaries in class. Talk about positive qualities in the summaries and possible improvement as part of this group process.

Strategy 6: One-Sentence Summaries

One-sentence summaries provide excellent feedback for the teacher. These very brief writings clearly indicate the level of student understanding of concepts. One-sentence summaries tend to be more difficult for students to write than paragraph summaries. Do not begin instruction in this skill until students are reasonably proficient in writing paragraph summaries.

Direct Instruction

1. Teacher Procedure A:
    a. After students have summarized a chapter or chapter section in two or three paragraphs, have them read through their summaries and circle key words and ideas.
    b. List key ideas on the board.
    c. Then, as part of class discussion, reduce the key ideas to four or five words or phrases.
    d. Finally, combine the four- or five-word phrase into one sentence which summarizes the entire chapter.
2. Teaching Procedure B:
    a. Present students with the following formula for a one-sentence summary
        1. Identify the topic being summarized.
        2. Tell what it begins with.
        3. Tell what is in the middle (or what it is mostly about); consider using words such as *covers, discusses, presents,* and *develops the idea that. . . .*
        4. Tell what it ends with.
    b. Begin with familiar materials such as fairy tales.
    c. Develop the summaries together over chapter sections. Summarize the summary of a text.
    d. Students may find the four-column worksheet and framed paragraph in Exhibit 4.2 helpful:

Exhibit 4.2

Summary Worksheet and Framed Paragraph

Identify the thing being summarized	Tell what it begins with	Tell what is in the middle—helpful words: covers, discusses, presents, develops	Tell what it ends with

Framed Paragraph

____

____________________ began with ______ (covering, discussing, presenting, developing the idea that), and ended with __________________________________

____

Guided Practice

1. After doing the above procedure several times with your class, begin assigning one-sentence summaries as a final step in paragraph summaries. After students have completed their paragraph summaries, have them reduce the summaries to one sentence.
2. Other ways to use one-sentence summaries:
   a. After lecturing on a topic, have students combine key ideas from their notes into a summary.
   b. Have students write one-sentence summaries about films.
   c. At the end of a class period, have students write a one-sentence summary expressing what they learned during the period.
   d. At the beginning of a class, have students speculate in a one-sentence summary what they know about a topic before they read, see a film, or listen to a lecture.
   e. Include one-sentence summaries in examinations. List three or four key concepts which students are to combine into a paragraph or a one-sentence summary.
   f. Have students write telegrams. The charge per word is $.15. Compete for the most inexpensive message.

Strategy 7: Reciprocal Teaching

Teaching students to lead their own discussion is a very powerful comprehension strategy, particularly conducive for processing main ideas. An excellent model for such instruction is **reciprocal teaching,** developed by Palinscar and Brown (1986). They have evaluated this procedure in a variety of content settings, and in all instances students taught through reciprocal teaching made far greater gains in reading comprehension than students instructed by more traditional approaches.

The procedure involves direct instruction in four different strategies: summarizing, questioning, noting difficult parts, and predicting. The reading materials are the students' own content texts or narrative materials.

Direct Instruction

1. Begin with a section of your content text which contains a series of well-written paragraphs.
2. Tell the students that you are going to demonstrate four different comprehension tasks: summarizing, questioning, noting difficulties, and predicting. List these strategies on the board.
3. Read through the first paragraph. In one or two sentences, summarize the gist of the material.
4. Then ask one or two questions about the paragraph's content. Have students answer the questions.
5. Next, note any vocabulary or unclear statements in the paragraph, and comment about what you think they mean. Ask students if there are any other questions that need clearing up.
6. Finally, predict what you think will be learned in the up-coming paragraphs.
7. Continue this modeling over a period of several days until students are comfortable with the strategies.

Guided Practice

1. Begin by modeling the four strategies. Then ask a student to be the teacher and do the four strategy sequences with the next paragraph. The student takes on the teacher's role, generating the summary, asking a few questions, discussing unclear words and ideas, and predicting upcoming content information.
2. The other students and the teacher answer the questions and provide alternative predictions, summaries, and questions.
3. Students take turns being teacher until the reading assignment is complete.

Strategy 8: Question-Answer Relationships (QAR)

Raphael (1982, 1984) has used an instructional model similar to reciprocal teaching for teaching students to lead discussions through questioning. Teaching questioning is readily adaptable to practically all classroom situations. Raphael classified questions into four types: "right there," "think and search," "author and you," and "on my own" questions. She then taught this classification system directly to the students. After students learn to recognize the different questions in this system, they use the guide to ask their own questions. This system is referred to as question-answer relationships, or QAR.

Direct Instruction

1. Give students a copy of the classification system (see Figure 4.1).
2. Have them read a story or section of content material.
3. Write one or two questions for each category found in the first one or two pages of the selection.
4. Students decide which type the question is: "right there," "think and search," "author and you," or "on my own" question. They must offer proof for decisions.
5. Continue this procedure until students succeed.

Guided Practice

1. Divide the class into groups of three or four students. Assign each group one or two pages of material, and have them develop samples of each question type.
2. Each group becomes teacher for their assigned pages. They ask the questions. The other students classify the questions and provide proof of their classification before answering the questions.
3. Continue having two or three students responsible for teaching a lesson. Have them be teachers for an entire story or content selection.
4. Working individually, students write discussion questions for a story. Students can trade and answer one another's questions.
5. Have students classify questions in their own text and in the teacher's guide. From this information, students can critique the quality of the questions.
6. Assign students a section of their science or social studies text. Have them come up with five "right there," five "think and search," three "author and you," and three "on their own" questions. Students present their questions for class discussion. From all questions offered, the class decides which ones are the best examples of each type. Students then use these questions in two-column reading guides (see Chapter 5). For testing, use "think and search" and "author and you" questions as essay questions and "right there" questions as objective questions.

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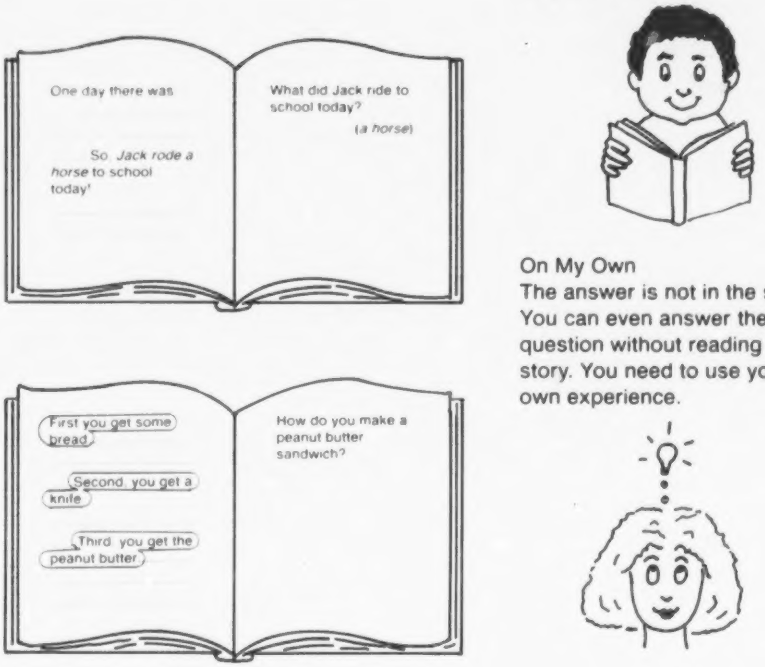

One day there was
So. Jack rode a horse to school today!
What did Jack ride to school today?
(a horse)
First you get some bread
Second, you get a knife
Third, you get the peanut butter
How do you make a peanut butter sandwich?

IN THE BOOK QARS

Right There
The answer is in the text, usually easy to find. The words used to make up the question and words used to answer the question are Right There in the same sentence.

Think and Search
(Putting It Together)
The answer is in the story, but you need to put together different story parts to find it. Words for the question and words for the answer are not found in the same sentence. They come from different parts of the text.

IN MY HEAD QARS

Author and You
The answer is *not* in the story. You need to think about what you already know, what the author tells you in the text, and how it fits together.

On My Own
The answer is not in the story. You can even answer the question without reading the story. You need to use your own experience.

Figure 4.1

Adapted from *The Reading Teacher*, "Teaching Question-Answer Relationships, Revisited," Taffy E. Raphael, Vol. 39, No. 6 February 1986, p. 519. Reprinted with permission of Taffy E. Raphael and the International Reading Association.

Exhibit 4.3

Sample Text and QAR Questions

Mark felt his way across the unlighted room. "Ouch!" he grumbled as his bare toe hit the cold metal leg of an unforgiving kitchen chair. Why was it always more difficult finding your way back to bed than heading to the kitchen for that beckoning chicken leg? In the last week, Matthew had cut his finger on a carelessly placed knife while he was using the edge of the counter as a guide, and then he had bruised his knee when he missed the top step of the stairs. "I wish I had some magic, see-in-the-dark glasses," he choked, still chewing on the last morsel of chicken. "I'd be a millionaire! Everybody who has ever heard a chocolate chip cookie whisper alluringly or a pickle cackle, 'come here!' would buy my night-stalker glasses. I would OOOOOOW!" Mark stopped dead as the back of the couch punched him in the stomach.

Type 1 (Right There): What did Mark say when he hit his toe?

Type 2 (Think and Search): What injuries did Mark suffer? (hurt toe, cut finger, bruised knee, punched stomach)

Type 3 (Author and You): If you were Mark, what might you do to eliminate all of the injuries? (I'd take food up to bed with me. I'd stop eating at night. I'd turn on the lights.)

Type 4 (On My Own): If you could invent anything in the world, what would it be?

Strategy 9: Conceptual Mapping

One way to instill active comprehension and dynamic discussion is through **conceptual mapping.** Conceptual mapping involves organizing information into graphic or pictoral form. It can be used for determining background knowledge, setting purposes before reading, guiding reading, and organizing post-reading. Maps evolve naturally into formats for writing and oral presentations. The technique takes a variety of forms, and the teacher's role varies from being very directive (formal conceptual mapping) to practically non-directive (student-generated mapping).

Formal Conceptual Mapping

Direct Instruction

1. Choose a word or concept which relates to the topic and write it on the board.
2. Have the students brainstorm all the information they know or think they know. List information on the board and place question marks after uncertain items.

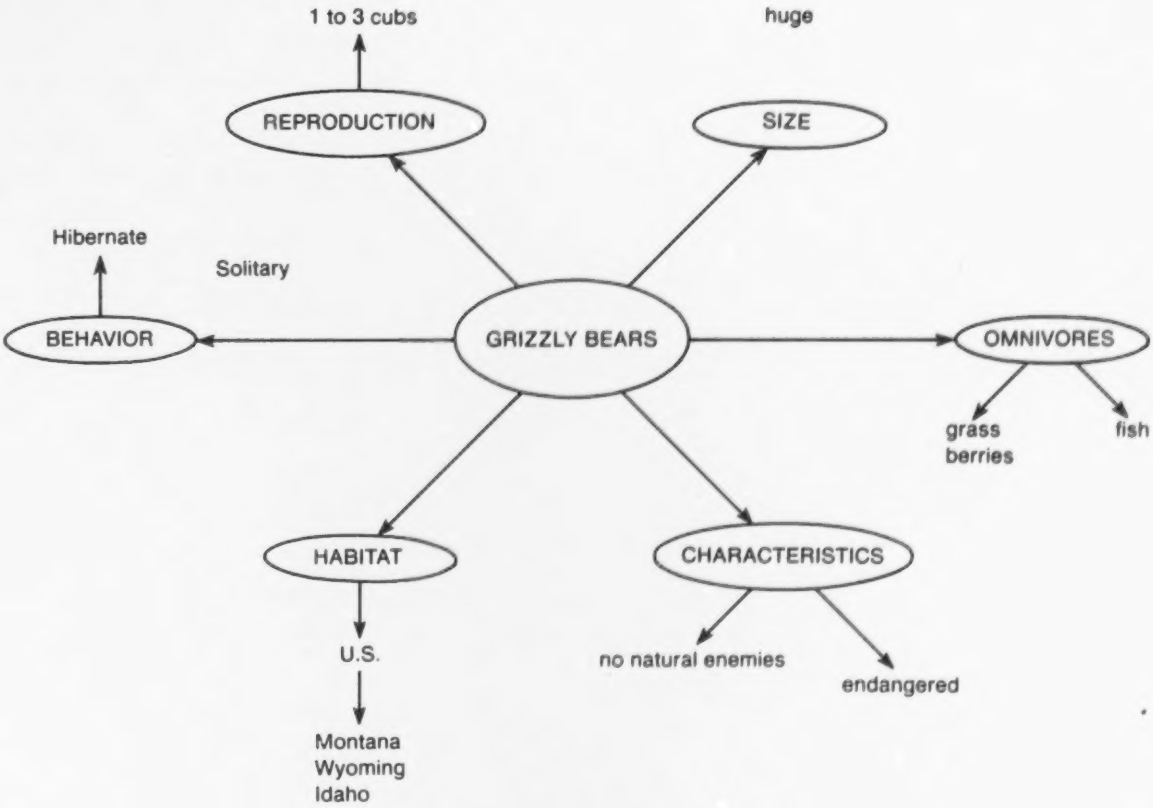

1 to 3 cubs
huge
REPRODUCTION
SIZE
Hibernate
Solitary
BEHAVIOR
GRIZZLY BEARS
OMNIVORES
grass
berries
fish
HABITAT
CHARACTERISTICS
U.S.
no natural enemies
endangered
Montana
Wyoming
Idaho

Figure 4.2 Pre-Reading Map

3. Group similar items on the brainstormed list, and have students come up with general topics. If using Power Thinking, the brainstormed items are power 2s and the topic headings are 1s.
4. The general headings may generate more information which can be added. Predict additional topic areas which might be covered in the reading and add these to the map.
5. Rewrite the original concept or word in capital letters in the center of the board. Place a bold box or circle around the word. Have students copy this in their notes.
6. Radiating out from the box, draw one line for each general topic, leaving space for more if necessary. Label these lines, and place the brainstormed information at the end of each.
7. While the students read, watch a film, or listen to speaker, they should add information to the appropriate topic and add new topics and information. Details may be added to the information by connecting them with additional lines. Model how you would do this with several paragraphs of the assignment. Add information as you read. Figures 4.2 and 4.3 present maps created before and after reading (Johnson, Pittelman & Heimlich, 1986).

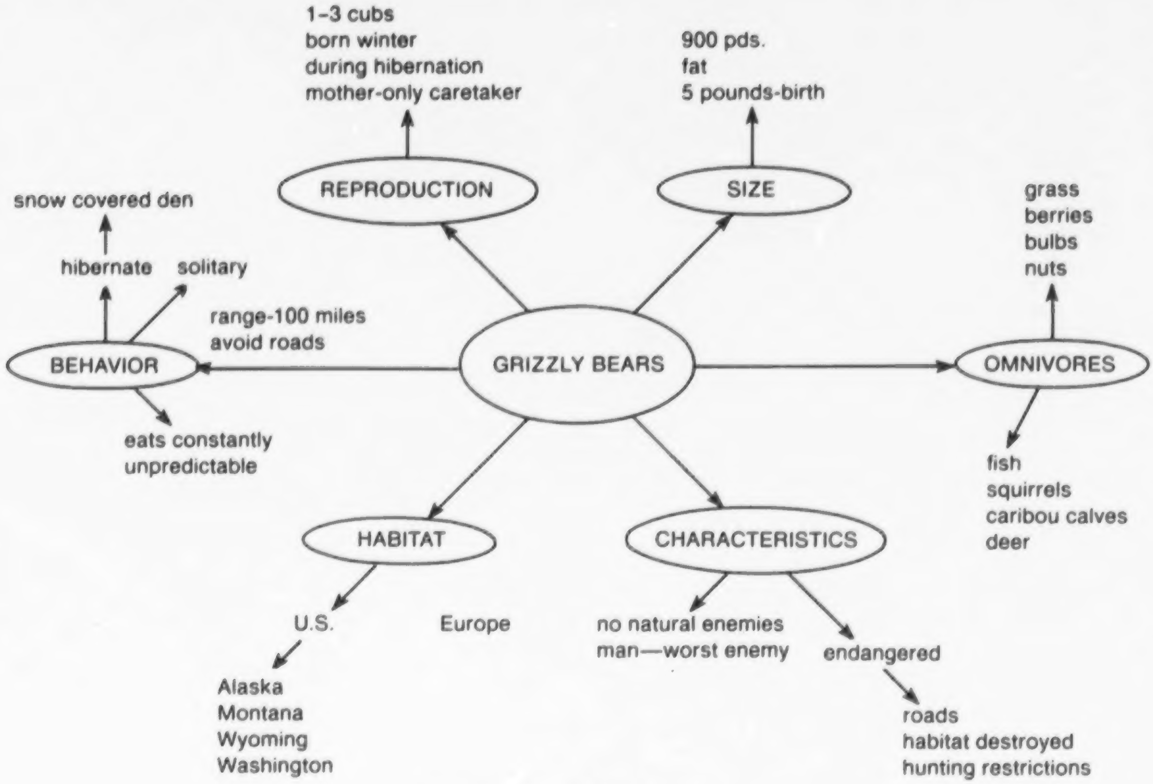

1–3 cubs
born winter
during hibernation
mother-only caretaker
900 pds.
fat
5 pounds-birth
REPRODUCTION
SIZE
snow covered den
hibernate
solitary
grass
berries
bulbs
nuts
range-100 miles
avoid roads
BEHAVIOR
GRIZZLY BEARS
OMNIVORES
eats constantly
unpredictable
fish
squirrels
caribou calves
deer
HABITAT
CHARACTERISTICS
U.S.
Europe
no natural enemies
man—worst enemy
endangered
Alaska
Montana
Wyoming
Washington
roads
habitat destroyed
hunting restrictions

Figure 4.3 Post-Reading Map

Guided Practice

1. Have students develop their own pre-reading maps by using chapter topics and skimming the chapter subheadings, introduction, and summary to find general topics. As they read, instruct students to fill in the maps.
2. Map the students' knowledge of any person, place, or thing. After reading or listening, revise the map to include new information.
3. Use a map as a reading guide for a chapter. Students complete the chapter guides.
4. Use maps as guides for library research and as tools to organize information for papers.

Student-Directed Mapping

Student-directed mapping works best as a post-reading activity. Students, preferably working in small groups, decide upon the most important ideas in their reading assignments and the ways in which these ideas relate to one another. Then they construct some type of visual scheme to represent their ideas. Encourage students to use pictures (drawings or cut-outs) in place of words. Changing written words into pictures encourages active synthesis of ideas. We recommend giving the students minimal direction. Several student samples representing a variety of maps are usually sufficient to launch students into creating their own unique representations.

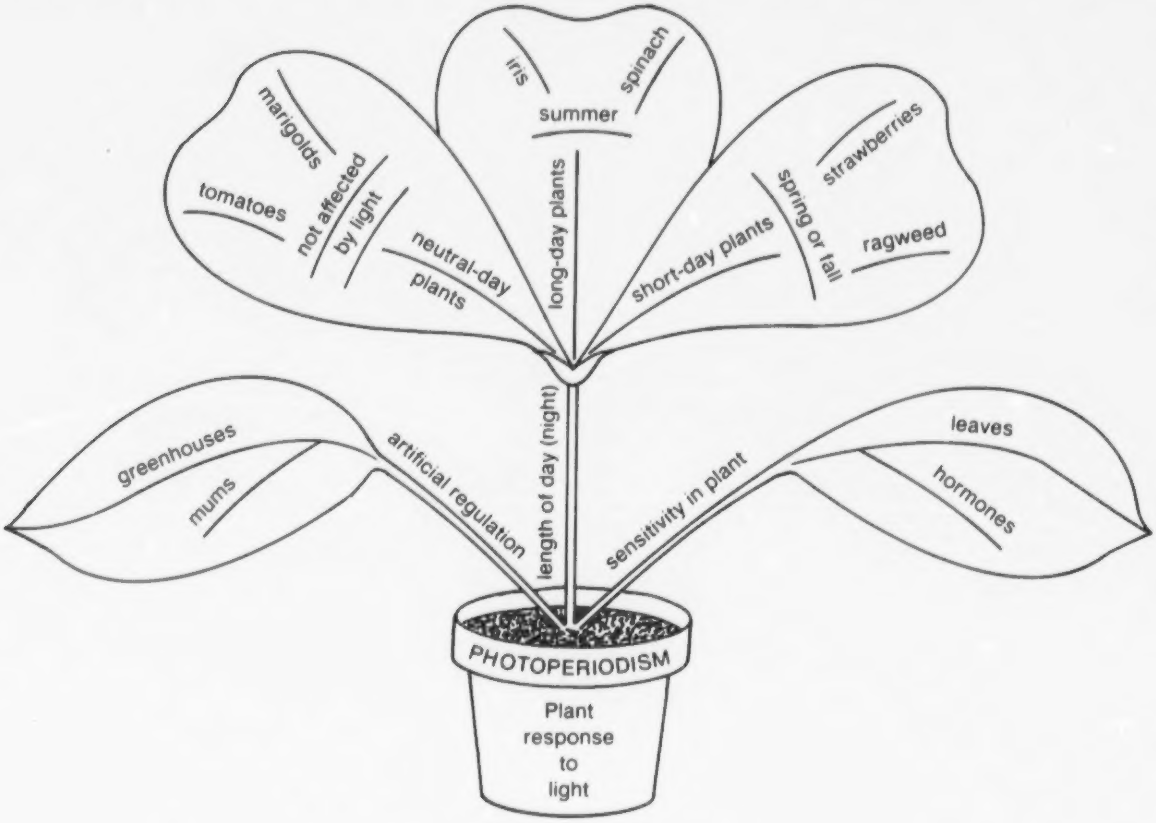

iris
spinach
summer
marigolds
tomatoes
not affected
by light
neutral-day
plants
long-day plants
short-day plants
spring or fall
strawberries
ragweed
greenhouses
mums
artificial regulation
length of day (night)
sensitivity in plant
leaves
hormones
PHOTOPERIODISM
Plant
response
to
light

Figure 4.4 Photoperiodism

Students must understand that there is no right way to map an assignment. The only criterion is that they represent in some way what they feel are the essential ideas and their interrelationships. They can structure their maps using words, pictures, phrases, circles, squares, or whatever creative endeavor they feel best portrays their analysis. The outcome is not nearly as important as the process of discussing content, deciding how to organize it, and the sheer pleasure of formulating their creations. No two maps should be the same. Upon completion, students should explain their maps to the class.

Maps become excellent props for oral presentations and for writing. Because mapping has inspired students to organize their thinking, their oral reports are usually far superior than those presented without this tool. Mapping leads readily into writing. Students' conceptual schemes become pre-writing tools. The main points depicted on a map become topic sentences in paragraphs, and details evolve readily into supportive sentences. If students use large sheets of paper and colored markers, maps enhance the appearance of any classroom. Figure 4.4 is a student map of an article on flowers.

Strategy 10: Story Mapping

Story mapping takes a variety of forms. Elementary and middle grade children are particularly responsive to character, setting, and sequence maps.

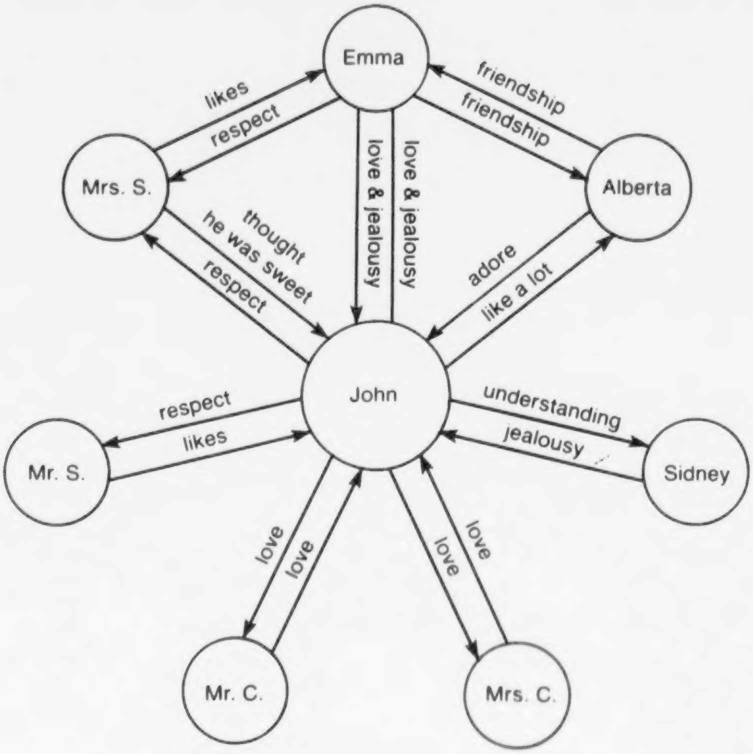

Emma
likes
respect
friendship
friendship
Mrs. S.
Alberta
love & jealousy
love & jealousy
thought he was sweet
respect
adore
like a lot
John
respect
likes
understanding
jealousy
Mr. S.
Sidney
love
love
love
love
Mr. C.
Mrs. C.

Figure 4.5

Character, Setting, and Sequence Maps

Direct Instruction

1. Use a familiar story.
2. After students have read the selection, list the name of a main character on the board. Brainstorm about the qualities of the character. Have students use pictures or words to describe these qualities.
3. List all of the characters on the board. Decide which is the main character. Brainstorm adjectives which describe the relationships of characters to one another. Create a "sociogram" map using these relationships, such as the one in Figure 4.5.
4. For setting and sequence maps, have students brainstorm all information they have inferred or read about the story setting. If the setting changes as the story evolves, determine the major events in the story, then determine the setting for each event. Either through words or pictures, describe the story setting and the sequence of settings. Include key story events in the map (Figure 4.6).

Guided Practice

1. Use a character map as an ongoing unit project for each story. Then find similarities and differences among major characters in the unit.
2. Use setting and story maps as pre-writing tools.
3. Map any television program.
4. Use a sequence map in combination with journal writing and a written travelogue.

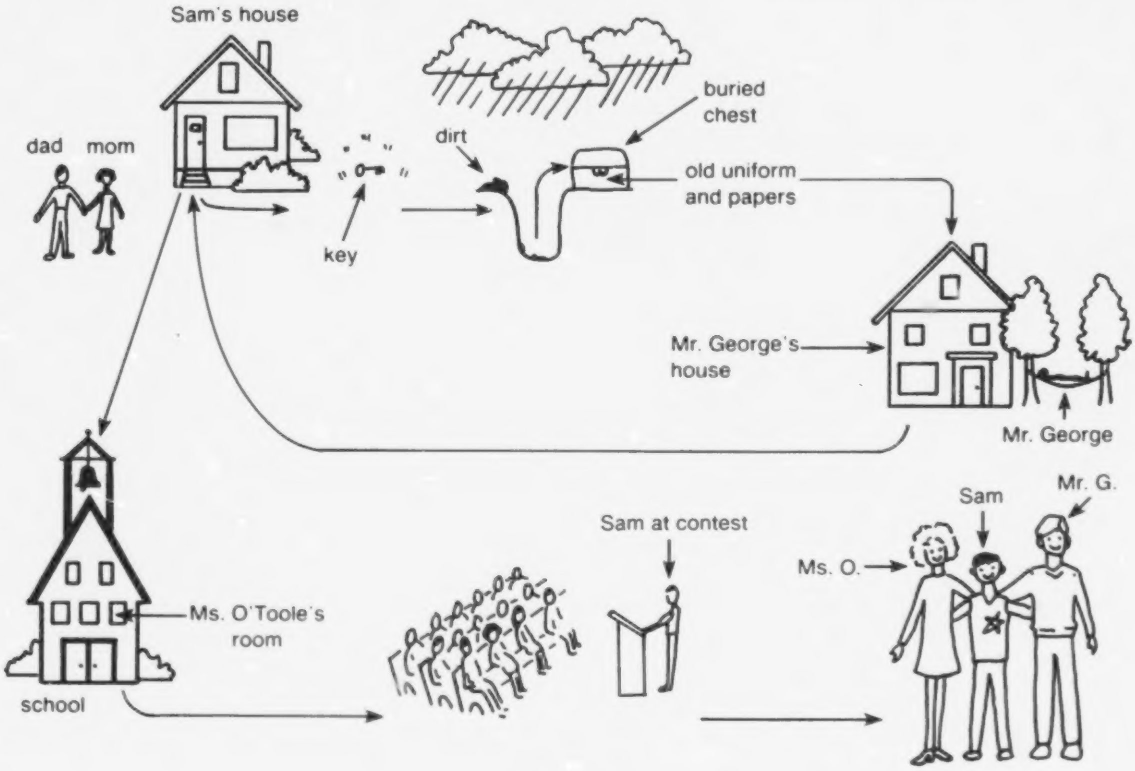


Figure 4.6

Summary

This chapter focused on two powerful ingredients of content learning: background knowledge and main ideas. These two areas are intertwined. Without background knowledge, students will have difficulty getting to the heart of a selection, and without strategic behaviors for discerning main ideas, even the richest background will not guarantee successful learning.

The better and more related the reader's background knowledge, the easier it will be to comprehend subject matter. Content materials provide a unique challenge because they are designed to provide students with new information. Seldom do students sit down to read with sufficient background knowledge to comprehend and learn the material on their own. Before students read, we must first find out what students know about the upcoming topic. In this chapter we explored specific techniques for activating prior knowledge, such as having students survey their text, brainstorm about concepts, do preliminary research, or generate questions related to the topic. Once we discover how much or how little students know, we can then teach essential concepts before students read.

Successful students glean the main points from a reading assignment. They intuitively understand the author's craft in main idea development and have specific strategies for organizing information from their reading. Behind successful students are teacher-coaches who have modelled a variety of approaches. In this chapter, we have explored teacher think-alouds, power thinking, mystery pot, selective underlining, paragraph and one-sentence summarizing, reciprocal teaching, question-answer relationships, and conceptual mapping. In each strategy, we demonstrate, encourage, and model until our students begin to perform. Then we gradually step aside and assist only when necessary. Teach competence in a variety of main idea behaviors; then encourage flexibility so that students can adapt these strategies to their own unique qualities as a learner.

CHAPTER 5

Learning Guides and Writing Strategies

In this section, we present a number of learning approaches which help students organize and remember content information. Students need to become competent in a variety of study procedures in order to develop their own flexible learning systems. To gain this flexibility, they should experience different ways to organize and write about information.

The key to the development of personal systems is self-monitoring. According to research in learning (Baker and Stein, 1981; Brown and Smiley, 1978), good students not only are competent in a variety of study strategies, they also know which produce the most effective learning. Poor students appear far more rigid. Typically they read and reread their textbook and have few systems for organizing information. Moreover, many are unaware of the need to self-monitor and to think consciously about how to learn. Successful students watch over themselves as they learn. They know when they know and what to do if they don't know.

Teach students to become their own "watchdogs" by having frequent "process" discussions. After a test, lead a discussion focusing on how they went about learning the material. Categorize approaches leading to successful and less successful outcomes. Have students keep learning logs, in which they record their study behaviors and note test performances. Are there any trends? Do some approaches seem more effective than others? For example, is test performance better when using a study guide than when studying without a guide? This awareness will help students know what they are doing to be successful.

Part 1: Learning Guides

Learning guides are note-taking procedures which provide focus and structure for understanding, organizing, and retaining information. We have adapted the guides to all content areas with both oral and written presentations. Students have created guides from lectures, films, and their assigned readings.

While there are many different ways for students to organize information, we have found three procedures particularly effective. These include two-column notes, problem-solution notes, and opinion proof guides. While guides vary according to instructional goals and the reading selection, they all provide students with a focus for responding to their reading. Such responses inspire students to become more active readers, which in turn leads to improved retention and interpretation of reading selections.

Strategy 1: Two-Column Notes

Two-column notes help students organize main ideas and details. Students divide their papers into two columns and record main ideas in the left column and details in the right. Next they use their notes for a study guide. Covering the information on the right, they test themselves with the key words or main idea questions on the left.

In order to develop their own two-column notes successfully, students must first understand how the author of their text develops main ideas. Take time to help students understand the structure and organization of their text before showing students how to develop two-column notes. Do not be surprised if you have to demonstrate the process many times before students can take notes independently. It is important, however, that students do learn to develop their own notes independently.

Direct Instruction

1. Show students how to write a learning guide for a reading assignment. Exhibits 5.1, 5.2, and 5.3 present samples for various content areas.
2. Photocopy a selection from the text, and make a transparency of the same selection.
3. Working through class discussion, have students read and selectively underline the selection. Help students mark main points (or power 1 ideas) and details.
4. Divide a piece of paper lengthwise into two columns. Model how to include main ideas (power 1 ideas) and vocabulary essential to content in the left column. In the right column, record information that elaborates on main points.
5. Demonstrate how to use the guide to review information. Cover the right-hand column with a sheet of paper. Show students how to self-test by using the questions and key words on the left.
6. After students say they know the material, give a short quiz to reinforce this technique.
7. Lead a discussion in which students talk about why the procedure helped them learn the material. Remind students that process discussions like this are essential for becoming aware of strategies that work.

Exhibit 5.1

Social Studies Two-Column Notes

Chapter 1—European Settlements in the New World

Section 1	
1. Spanish Armada	1. Name of the Spanish fleet that sailed to attack England.
2. Date the Spanish fleet sailed.	2. 1588
3. Strategy English used against the Spanish.	3. Moving, picking off the slower Spanish vessels, then retreating.
4. How did the English force Spanish out of Calais?	4. By sailing several old burning vessels into the harbor.
5. Other fates confronted by the Spanish in English Channel.	5. Storm wrecked many remaining vessels.
6. Why was defeat of Spanish Armada important to American History?	6. The English became a new force on the high seas, challenging Spain for establishing colonies on the eastern coast of America.

Exhibit 5.2

Language Arts Two-Column Notes

The Pearl: Chapter One Study Guide

1. Three characters the doctor introduced in the opening chapter of *The Pearl.*	1. Kino, Juana, Coyotito
2. What provides the rhythm for the Song of the Family?	2. In Kino's mind, the grinding stones worked by Juana create the rhythm for the Song of the Family.
3. What causes Kino to hear the Song of Evil?	3. The appearance of the scorpion causes Kino to hear the Song of Evil.
4. Think of a few words to describe the living conditions of the Indians.	4. Primitive, poverty-stricken, simple, uncivilized, traditional, isolated, etc.
5. How does Kino injure his hand?	5. He smashes it against the gate of the doctor's house.
6. How does the mood of the story change in the first chapter?	6. In the beginning the mood is peaceful and calm. With the coming of dawn there are many pleasant sights, sounds, and smells. The characters seem content. When Coyotito is stung by the scorpion, however, the mood of the story becomes threatening and fearful. As the Indians lose their feelings of security, a sense of evil replaces their sense of tranquility.
7. Do you think Coyotito had ever seen a scorpion before? Explain.	7. No, Coyotito laughed when he saw the scorpion and tried to reach out and touch it. He did not understand how dangerous it was.

Exhibit 5.3

Mathematics Two-Column Notes

Geometry, Chapter 7

7.1: Induction and Intuition (p. 216)	
1. What is induction?	1. The process of finding a general principle based upon the evidence of specific instances.
2. Give an example in induction.	2. In elementary school, every time I added two numbers I always got a bigger number than either of the numbers. So, I might induce that every time I add two numbers the result is greater than either of the numbers.
3. What is intuition?	3. The mental process of acquiring information or beliefs from feelings, hunches, or insight.
4. Give an example of intuition.	4. I can't remember how to solve the problem, but it just seems like the answer should be 7.
7.2: Deduction (p. 217)	
1. What is deduction?	1. The process of reasoning from accepted statements to a conclusion.
2. Give an example of deduction.	2. Based on calculations and can be solved. $10 - x = 5$, $x = 5$. Deduction is ALWAYS true.
3. What are premises?	3. Statements which are taken for granted or are known to be true. (p)
4. What is a conclusion?	4. A final statement about premises. (q)
5. Rules of logic.	5. $\to$ "implies" $-$ "not" *Valid arguments* $p \to q$ $-q \to -p$ $p \to q$ & $q \to r$, then $r \to p$ *Not valid* $p \to -q$ $q \to p$ $-p \to -q$

Guided Practice

1. Divide the class into groups; have them write study guides for a reading assignment. Students then present their guides for class discussion.
2. It is important that students create their own guides. Always help students decide what to include as part of pre-reading discussions.
3. Continue to remind students to use their guides for self-testing.
4. Reward students for developing guides by giving extra credit points, or allowing them to use them on some tests.
5. After a test, ask how many students made and used their own reading guides. Compare those students' test results with the scores of students who studied by reading and rereading the text book.
6. After students can create their own learning guides, encourage them to ask more difficult questions in the left-hand column. Most students are easy on themselves and write low-level questions unless they have specific instruction. Incorporate Raphael's self-questioning (see Chapter 4, strategy 8) in conjunction with learning guides. Have students read an assignment and individually or in groups come up with "right there," "think and search," "author and you," and "on your own" questions. Have each group present their questions for class discussion. Analyze the questions for their effectiveness.
7. If students continue to need direction, provide a guide on how to write a learning guide (see exhibit 5.4).

Exhibit 5.4

A Guide for Writing a Study Guide

American History

1. Write a question focusing on what you think you will learn from this assignment. Read through the introduction to Chapter 20, Section 2.	1.
2. Now look at the subsection, "Economic Chaos in the South," and reduce this passage of slightly over 100 words, to a 10-word, telegraph-style message that would give the reader with a good impression of the main idea.	2.
3. Now write a "Think and Search" question and answer dealing with the problems of the four million former slaves.	3.
4. Write a question dealing with the main idea of the last paragraph of "Social Chaos."	4.

Learning Guide Variations

Once students can use two-column notes successfully, encourage them to experiment with variations of the technique. As part of pre-reading, discuss essential concepts in the selection and different ways to organize these ideas for learning. Encourage students to come up with their own systems for organizing the material. Exhibits 5.5 through 5.10 provide examples of learning guide variations.

Three- to Four-Column Study Guides

In Exhibit 5.5, the left-hand column is used for listing vocabulary words. (The author usually identifies these words with italics or bold print.) In the second column, the students write as many questions as they can about the term. The third column includes answers to questions. For those not answered in the text, the students leave the third column blank. If the questions are not answered in subsequent discussions, the students work in small groups with a variety of sources until they can come up with the answers.

In Exhibit 5.6, the left-hand column includes questions pertaining to material in the text. In the second column are notes from the text. The third column contains information from class discussion, speakers, films, or personal notes that help each student remember the content.

In Exhibit 5.7, the left-hand column is used for terms to be defined. The second column contains definitions, the third column contains diagrams, and the fourth column contains exercises and problems from the text which relate to the terms.

In Exhibit 5.8, the left-hand column is used for terms. The second column contains definitions, the third column contains a formula, and the fourth column contains student questions about the various terms.

Exhibit 5.5

Science Three-Column Notes

Vocabulary Word	Questions	Answers
1. Appendage	1a. What are Appendages?	1a. extensions of the body used for movement
	1b. List different types of appendages and how they are used.	1b. legs, run or walk; wings, fly; fins, swim
2. Zoologist	2a. What is a zoologist?	2a. biologist specializing in the study of animals
	2b. List some questions you might ask a zoologist.	2b.
3. Vertebrate	3a. What are vertebrates?	3a. animals with backbones
	3b. Why are vertebrates classified with lancelets and tunicates?	3b. lancelets and tunicates have notochord, which is similar in both structure and function to a backbone.

Exhibit 5.6

Science Three-Column Notes

Questions	Book Notes	Class Discussion
Chapter 5 "Water in the Sea" 1. On the drawing of the water cycle, label the processes and features. Indicate at each feature the length of time during a 100-year period that a water molecule would spend there. 2. How do salts and other particles get into the oceans? 3. Define *ion*.		

Exhibit 5.7

Mathematics Four-Column Notes

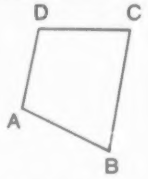
Term Problem	Definition	Diagram	Questions
1. Quadrilateral	1. Union of 4 line segments that join 4 coplanar pts, no 3 of which are collinear. Each intersects exactly 2 others, one at each end point.	1. 	1. Which are quadrilaterals?
2. Vertices a. consecutive b. opposite	2. End points of the line Name the segments a. angles that share a side b. angles that don't share a side	2. A,B,C,D a. A&B	2. Name the vertices a. consecutive b. opposite

Exhibit 5.8

Mathematics Four-Column Notes

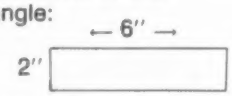
Term Concept	Definition (if possible in your own words)	Formula	Questions
Area: a. Rectangle b. Square c. Circle	The amount of two dimensional space contained in a plane figure.	A = w × L	Find the area of this rectangle:  A = 2" × 6" = 12 square inches

Exhibit 5.9

Reading Graphs: Four-Column Notes

Name ______________________

Date ______________________

Graphs:
Use your geography text: page 200—circle graph

Main Idea	Details	Cause	Effect

Summary sentence: ______________________

____

____

____

Text: page 211—pictograph

Main Idea	Details	Compare	Contrast

Summary sentence: ____

____

____

Exhibit 5.10

Language Arts Four-Column Notes

Character	Personality Trait(s)	Supporting Action(s)	Supporting Conversation(s)	Page

Strategy 2: Problem-Solution Guide

The **problem-solution guide** provides a structure for thinking and writing about issues (Alder, 1973). It is particularly effective for analyzing social issues, current events, and conflict in short stories. Exhibits 5.11, 5.12, and 5.13 are sample problem-solution guides.

Direct Instruction

1. Divide a paper lengthwise into two columns.
2. Label the colums "Questions" and "Answers" (including supporting details).
3. Ask four questions in the first column.
   What is the problem?
   What are the effects?
   What are the causes?
   What is the solution?
4. Have students read the assignment.
5. Model for students how to take notes on the central problem, causes, effects, and solutions in column two. Include supporting details.
6. Encourage students to add their own background information.
7. Questions for students to ask themselves:
   a. To find the cause(s), ask "What is the reason?" "Why did it happen?"
   b. To find the effect(s), ask "What happened?" "What was the result or outcome?" "What happened because of the problem?"
8. Bring the signal words that show cause and effect to the students' attention (see Exhibit 5.11).

Guided Practice

1. Continue assisting students until they can work independently.
2. Using information from this guide, have students write paragraphs, essays, present speeches, or conduct further research.

Exhibit 5.11

Cause-Effect Signal Words

Cause:
reason
because
led to
on account of
due to

Effect:
finally
for this reason
consequently
then, so
result, outcome
therefore, thus

Exhibit 5.12

Science Problem-Solution

Questions	Answers (Include supporting details)	
1. What is the Problem?	America's topsoil is eroding away at an alarming rate.	Ugly ditches cut through the hillside Creek bed choked with topsoil
2. What are the effects?	Less production of crops.	Soil can't produce as many products.
3. What are the causes?	Poor conservation	Not proper protection for soil, not rotating crops.
4. What are the solutions?	Better conservation	No-till, new fertilizers, strip farming

Exhibit 5.13

English Problem-Solution

Based on the "Cop and the Anthem"

Questions	Answers (including supporting details)	
1. What is the problem?	Soapy needs shelter.	Cold weather No money Past experience in jail.
2. What are the effects?	He commits crimes	Steals umbrella Leaves restaurant without paying. Throws rock through window. Tries to pick up "lady."
3. What are the causes?	Soapy is a bum.	Lazy; jobless.
4. What is the solution?	Change lifestyle	Church music, decides to get a job, gets picked up for loitering, spends winter in jail.

Exhibit 5.14

Alternative Format Problem-Solution

PROBLEM: Husband and wife both working outside of the home.

EFFECTS:	*CAUSES:*
1. Increased need for child care	1. Neither parent home to take care of children.
2. Changing of traditional roles	2. In order for family to operate smoothly, household chores have to be shared. Wife may have to chop wood, husband may have to fix dinner.
3. Stress in marriage	3. Less time for each other. Difficulty being super-parent, super-spouse, and super-worker.
4. Higher standard of living	4. Two incomes

SOLUTION: Counseling for husband/wife or for family
Legislation for more quality child care facilities
Lowering expectations
Hiring for jobs like cleaning and household maintenance

Strategy 3: Story Grammars

Teaching students about the components, or grammar, of a story leads to improved comprehension. **Story grammars** characterize the general structure of stories by defining what most have in common. It is, in effect, a concise summary of the plot and setting of a narrative. Students should understand the generic architecture of stories and learn to use this framework in both comprehending assignments and in composing their own stories (Spiegel & Fitzgerald, 1986). Moreover, an understanding of story grammars will lead to critical analyses of stories. Students will soon discover that many stories which lack key components are not well written.

We have included two story grammar formats. The first is somewhat easier for students to use; thus, it is more appropriate for younger students than the second format. Consider using both types with older students.

Story Grammar Format 1

The story map of format 1 contains the following key elements in a story: major character, setting (time and place), the problem (characters attempt to solve problems), the goal of the main character, the main events of the story, and the resolution (see Exhibit 5.15).

Exhibit 5.15

Story Grammar Format 1

Setting:

Characters:

Problem:

Goal:

Events leading to goal (list in order):

Resolution:

Direct Instruction

1. Review a familiar story such as "Jack and the Beanstalk." Help fill out the map by asking guiding questions.
2. Setting questions: Where did the story occur? When did the story occur?
3. Character questions: Who is the main character in this story? Whom is the story most about? Who are the other characters in the story?
4. Problem and goal questions: What is Jack and his mother's problem? Why are they in trouble? What do they want to happen?
5. Resolution questions: Do Jack and his mother have a problem at the end of the story? Why do they no longer have a problem? What did Jack and his mother do to solve the problem?
6. Pose questions that help students follow the story line from the problem to the resolution. These questions should concentrate upon key events in the sequence rather than specific details.
7. The completed story grammar might look like this:

   Setting: Jack's house, the beanstalk, the giant's house.

   Characters: Jack, Jack's mother, giant, giant's wife

   Problem: Jack and his mom were poor and greedy

   Goal: They wanted to have money, but they did not want to work for it.

   Events leading to goal:
   1. Jack traded the cow for five beans.
   2. Jack's mother threw the beans outside. The beans grew into a huge beanstalk.
   3. Jack climbed the beanstalk and stole a bag of gold from the giant.
   4. After the gold was gone, Jack stole a hen that laid golden eggs.
   5. Jack was not content. He went up the beanstalk again and stole the golden harp.
   6. The giant tried to catch Jack, but Jack chopped down the beanstalk which killed the giant.

   Resolution: Jack and his mother were rich. Neither had to work ever again.
8. Work through several other familiar stories with the students.

Guided Practice

1. Read the setting and character descriptions from a story and have students predict the problems, goals, events, and resolutions. This could be a written or oral activity.
2. Use story grammars as notes for oral book reports.
3. Have students do several different story grammars of a selection. Each grammar should have a different problem statement. For example, with "Jack and the Beanstalk" the problem statements might be
   a. Jack was stupid.
   b. Jack was a thief and a murderer.
   c. Jack and his mother were poor.

   Having developed different problem statements, divide students into groups. Have each group work out a different story grammar for one problem statement. Then have the groups present their grammars and convince other class members that the story events and the resolution provide evidence that their problem is developed in the story.
4. Have students develop grammars for television programs.
5. Develop alternatives formats (see Exhibits 5.16, 5.17, and 5.18).

Exhibit 5.16

Alternative Story Grammar Map

Who has the problem? ____

____

Resolution: Three possibilities

Character solves problem ← → Character learns to live with problem ← → Problem defeats character

State what problem is: ____

How is the problem solved? ____________________________________

____

____

____

This adaptation helps students analyze the conflict in short stories. Supply students with the following skeleton guide which students use for notetaking.

Exhibit 5.17

Plot Summary Worksheet

The Problem

Event 1

Event 2

Event 3

Event 4

Resolution:

Now summarize the plot using the above information:

The main problem in this story is ______________

There are _______ main events. (Explain main events) ______________
At the end of the story, the character (solves the problem, learns to live with the problem, is defeated by the problem).

Exhibit 5.18

Outside Reading Reports

Name ______________________

Period ______________________ Quarter ______________________ Points ______________________

Title of Book ______________________ Number of Pages ______________________

Summary of Plot (Include main problem, important events leading up to the resolution of the problem, and how the problem is resolved.) Consider using Power 1-2-3-2-3-2-3

Describe the Setting of the book (Power 1-2-2)

Describe the main character of the book (Power 1-2-3-3)

Tell your favorite part of the book and why. (Be sure to state the reason you liked this part of the book best.)

Story Grammar Format 2

In more complex stories, the protagonist or main character in the story faces a series of events. Each event in the story is analyzed according to problem, attempt, and consequence until the final resolution is determined.

Direct Instruction

1. Use a simple story to introduce the components.
2. Explain that most stories have definite parts and that understanding these parts and their relationship to each other will improve their understanding of stories.
3. Begin by discussing the concepts, problems, attempts, consequences, and resolution as they relate to an every-day situation. Consider this simple example: "Let us say that your dog barks every night and that the neighbors are getting angry. Your dog is keeping them awake. You decide that you are going to keep your dog in the house at night. Your plan works. The dog is happier and the neighbors can sleep." Even a very simple story like this can be analyzed by using a story grammar (Lipsom, 1985).

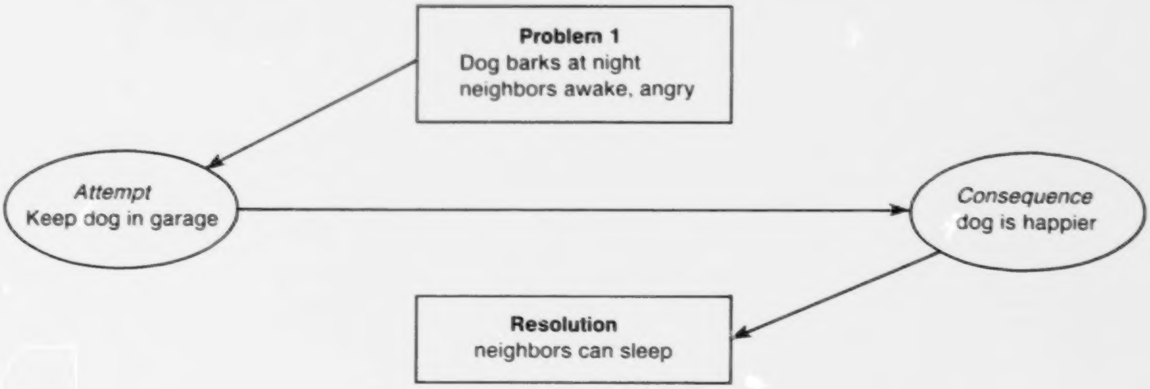

Problem 1
Dog barks at night
neighbors awake, angry
Attempt
Keep dog in garage
Consequence
dog is happier
Resolution
neighbors can sleep

Figure 5.1 Simple Story Grammar Format 2

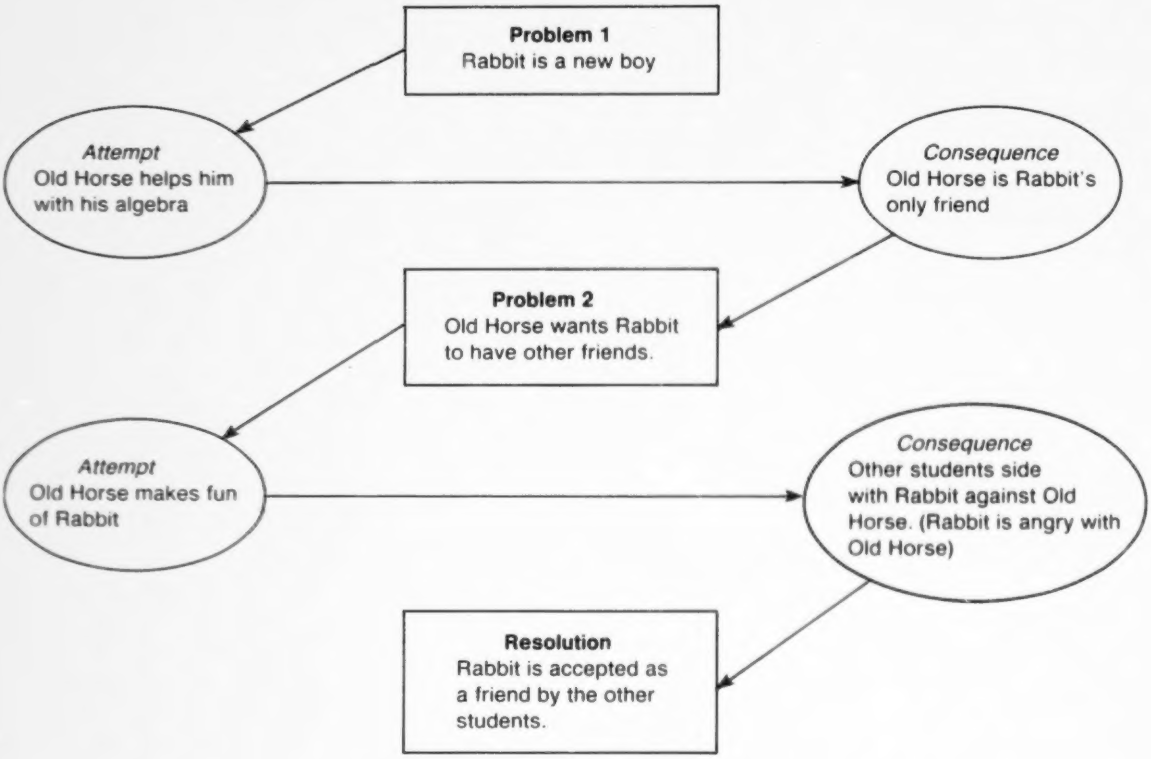

Problem 1
Rabbit is a new boy
Attempt
Old Horse helps him with his algebra
Consequence
Old Horse is Rabbit's only friend
Problem 2
Old Horse wants Rabbit to have other friends.
Attempt
Old Horse makes fun of Rabbit
Consequence
Other students side with Rabbit against Old Horse. (Rabbit is angry with Old Horse)
Resolution
Rabbit is accepted as a friend by the other students.

Figure 5.2 Complex Story Grammar Format 2

4. Explain that most stories are not this simple. Usually characters must solve several problems before the conflict is resolved. Then show students how the map works with a more complex story, in which the main character faces a series of problems. The above example is based on the short story, "Old Horse" (see Chapter 7 for the text of "Old Horse.")

Guided Practice

1. Continue working through several stories with the class.
2. After students begin feeling comfortable with the strategy, have them develop story grammars for class and individual selections. Encourage diversity. Have students present their grammars to the class.
3. Have students use a grammar map to plan their own writing. If key components of the grammar are left out, the students might consider revision.

Strategy 4: Opinion/Proof

Opinion/proof is an organizational system that can help students learn to support an argument with evidence (Santa, Dailey, Nelson, 1985). Students find this format useful for organizing information from reading assignments and for pre-writing.

Direct Instruction

1. Divide the paper into two columns (see Exhibits 5.19 to 5.22).
2. Label the columns "Opinion" and "Proof."
3. Have the students read the assignment.

4. Model the strategy for students by developing an opinion statement (or power 1 statement) based on the assignment (see Exhibits 5.23 and 5.24).
5. Show students how to support their opinion with details (power 2 and 3 information) from the material.
6. For some materials you may want to develop a conclusion.
7. Then show students how to use the guide for writing persuasive paragraphs and essays.

Guided Practice

1. Divide the class into groups. Have each group complete a guide for an assignment and present their work to the class for discussion.
2. Continue to model this procedure until your students can complete the opinion/proof guide independently.
3. Develop alternative formats such as those in Exhibits 5.23 to 5.26.

Exhibit 5.19

Social Studies Opinion/Proof

Opinion	Proof (Including supporting details)
Constitutional convention was necessary	Articles of Confederation were weak; caused concern about new government
	Trade between states was problem; colonies competed with one another.
	Lack of power over foreign trade; no central government with power to impose tariff
	Lack of power to enforce treaties; foreign countries did not recognize American government
Conclusion	The Articles of Confederation had to be revised because of its weakness. Need a new executive branch, a judicial branch, and strong central government

Exhibit 5.20

Social Studies Opinion/Proof

Opinion	Proof
Napoleon was a great leader.	1. ended revolution 2. drew up new constitution 3. fair taxation 4. government workers chosen for ability

Student writing samples based on Opinion/Proof:

> Napoleon was a great leader. He brought an end to the revolutionary fighting in France and then established a national police force to keep peace. He told all the nobles who had fled the country during the fighting that they could return home. Napoleon also drew up a new constitution that gave all male citizens the right to vote. All citizens, including the rich, were made to pay taxes and government workers were chosen for their ability. It did not matter who they were. And last, but not least, he led the military to many victories!!!
>
> Napoleon was not a great ruler. He cost France many lives during all those wars when he tried to rule the world. The people who had run away during the revolution could only come back to their homes if they supported him! Also, he only allowed the men to vote, as if he didn't think women would do a good job.

OPINION/PROOF CHECKLIST

_______ Is my statement clear?

_______ Do I need more evidence to support my statement?

_______ Is my most convincing fact placed in a position in my paragraph that will make it stand out clearly?

_______ Could I move my facts around in a way that would make my ideas clearer to my readers?

Exhibit 5.21

English Opinion/Proof

Opinion	Proof (including supporting details)
Kino in *The Pearl* was selfish and chauvinistic	He sat outside while Juana, his wife, did all of the work. He made decisions for the family without consulting her. For example—decided to keep pearl, decided to bury pearl, wanted rifle, ended up using it to destroy the thing he loved most He did not accept advice from friends and family. Would not listen to brother and other villagers.

Exhibit 5.22

Science Opinion/Proof

Opinion	Proof (supporting evidence)
There should be more grizzly bear habitat	Grizzlies are a threatened species. Problem caused by hunters, people encroaching on habitat. Logging operations decrease grizzly habitat in Forest Service lands. Hiking, camping, and hunting activities interfere with grizzlies.
Conclusion	Human activities that interfere with grizzlies should be limited.

Exhibit 5.23

Organizing Information Through Power Thinking

Opinion	Support for Opinion
Begin statement with "I think that . . ."	Specific details from the story (power 2 ideas).
"I conclude that . . .", "In my opinion," etc.	Using power 3 ideas, explain why these details are supportive.
1.	2. 3 2. 3 2. 3
1.	2. 3 2. 3 2. 3

Exhibit 5.24

English Spool Paper*

Spool Paper Worksheet
(paragraph 1)

The name of my (book, story) is ____________________

__________ . The author is ____________________ .

This (book, story) is about ____________________

In this paper I am going to ____________________

____________________ .

Conclusions (Power 1s)	Proof (Power 2s)
(paragraph 2)	
1. I think that ____________________ ____________________ ____________________ .	2. One reason I feel this way is ____________________ ____________________ .
	2. In addition, ____________________ ____________________ ____________________
	2. Finally, ____________________ ____________________ ____________________

---

*Spool paper techniques are discussed in Part 2, Strategy 3.

111

(paragraph 3)

1. I also think that ____________________

____

____

2. One reason I feel this way ____________

____

____ .

2. In addition, _________________________

____

____

2. Finally, _____________________________

____

____

(paragraph 4)

In conclusion, I think that ____

__________ and ____________________ . I really (liked, disliked) this story because ________

________________________________ .

I would recommend it to anyone who likes to read stories about ____________________________

____ .

Exhibit 5.25

English Opinion/Proof Worksheet

Discussion Group Worksheet

Name ______________________________

Period ____________________

Story ______________________________

Total Points ______________

1. In your journals, read and respond your reactions to the story. (2 points)
2. Opinion/Proof Sheet: Look over the comments you made on the story. Think of the conclusions you can draw about the story: your opinion or conclusion about a particular character; whether or not you agreed with the actions of a particular character; why you think an event, sentence, or word in the story is especially important. Write down your conclusions in the left column of the Opinion/Proof sheet. In the right column, write down specific details from the story that support your conclusions.

   DO NOT just give your personal evaluation of the story, (I liked the story because, this story was dumb because, etc.) (5 points)
3. Get your Read/Respond and Opinion/Proof Sheet approved by the teacher.
4. Discuss the story with your group on your assigned day.
5. Write at least one Opinion/Proof paragraph that develops an idea discussed in your group. Make sure your paragraph has a good topic sentence and has details from the story to defend your conclusion. Use the following framed paragraph* if you find it helpful. (5 points)

   One conclusion that we discussed in our group was . . .
   One statement from the story that was used to defend this conclusion was . . .
   Also, . . .
   In addition, . . .
   Finally, . . .

   (Total Points Possible:12)

---

*Framed Paragraphs are discussed in Part 2, Strategy 2.

Exhibit 5.26

Science Opinion/Proof

After reading several articles about the disappearance of dinosaurs, students were asked to form a hypothesis about why dinosaurs disappeared. They were then to support their hypothesis with evidence from the articles they had read. They used the guide to write a paragraph supporting the hypothesis.

Hypothesis	Evidence to prove hypothesis
A giant asteroid hit the earth.	1. Impact would release 100 million megatons of energy—rise in earth's temperature would kill dinosaurs—accounts for abrupt extinction. There is good evidence from geological records that extinction was abrupt. 2. Could explain increase in iridium levels occurring at time of extinction. 3. Extinction was abrupt

Part 2: Writing Strategies

If there is something students must learn, have them write about it. Writing inspires active production that requires students to make personal sense out of information. Students engage their own background, their own words, and their own ideas to write about content information.

Reading guides evolve naturally into writing. Once students have organized information from their reading, they can readily use it for writing. The opinion/proof reading guide becomes a tool for persuasive writing. The problem/solution guide evolves into an analytical paper. The left column of two-column notes contains the essential ingredients of a summary.

In addition to these various organizational formats, we also advocate the use of content journals, paragraph frames, and spool papers. We explain these procedures in this section, along with an approach called RAFT for developing writing assignments in the content areas.

Strategy 1: Content Journals

Not all writing in the content areas should be formal assignments that will be read and graded by the teacher. Students also need opportunities to write informally. **Content journals,** which provide a medium for informal writing, can be readily incorporated into any content classroom.

Journal writing takes many forms, from personal reactions to issues and events to more formal, prewriting experiences. In all situations, however, the spirit of the activity is to encourage the students to write without fear of interrogation or the teacher's red pen. The primary audience of a content journal is always the writer.

We require students to keep a spiral notebook in the classroom and to use it for writing three to five times per week. Journal writing usually takes from two to ten minutes and occurs anytime during the class period when writing seems appropriate. It is important that students write often, so that journal writing becomes a habit.

Direct Instruction

1. Model journal writing by keeping a journal yourself whenever time for journal writing occurs in class. Read your entries to the class.
2. When appropriate, the teacher can suggest the following sample journal entries as pre-reading activities:
   a. "After looking at the title and pictures in this story, I think the author will be dealing with the relationship between parents and their teenage daughter. I think she will have the same problems I do, such as getting her parents to treat her as a responsible human being!"
   b. "Abraham Lincoln is mentioned in several subheadings. I wonder what role he played during this time in history?"
3. Model journal entries as they seem appropriate. After reading each of your entries, allow students time to brainstorm other possibilities.

Guided Practice

1. Journals provide a system for helping students set the stage before they read. After students have surveyed a chapter by reading the introductory paragraphs, bold headings, and chapter summaries, have them write statements and questions about what they hope to learn from the selection. After reading, students answer their pre-reading questions in their journals and summarize what they learned from the assignment.
2. If you assign a research paper during the semester, have students keep a journal as they research their subject. Two or three times a week have them record any thoughts about their paper as well.
3. Have students react personally to historical, scientific, or current events. For example, after students have seen a film or read a selection, they should record personal reactions in their journals.

4. Journals can help students develop study skills. By summarizing notes of the previous day's activities, students can use their journals to review what they learned. They can also use journals for their own "process conferences" by writing ideas about how to study for a test and later discussing how effective their strategies were in light of their performance.

5. Other ideas for journal entries
   a. To start discussions
   b. To summarize lessons
   c. To solve problems
   d. To respond to reading
   e. To practice writing essay questions
   f. To brainstorm ideas about content
   g. To generate paper topics
   h. To clarify questions about an assignment or course content
   i. To let off steam
   j. To answer questions posed by the instructor
   k. To write mathematical problems
   l. To express opinions
   m. To explain a current event
   n. To summarize teacher directions before beginning an activity
   o. To predict results of scientific experiments
   p. To respond to movies

Strategy 2: Framed Paragraphs

Framed paragraphs are pre-writing tools which guide the development of well-formed paragraphs. They are skeleton formats, containing information about the main idea and transitions words that guide the organization and the development of supportive details. Frames are particularly effective for assisting students with essay examinations. Once students understand how to compose a well-organized response to an essay question, framing the answer will no longer be necessary. Exhibits 5.27 to 5.31 present frame paragraphs for various content areas.

Direct Instruction

1. Supply students with a paragraph skeleton, or frame.

2. Provide students with the topic sentence and transitions you feel are necessary. Insert a series of dots where you would like students to insert their own words. Then have the students rewrite the paragraph, combining their own words with the teacher-made frame.

   For example:

   a. Brainstorm topics that might be opinions, or give students the topic you have selected for the paragraph.
   b. Explain the structure and provide an example.

      Structure:
      1. The topic sentence is a general statement or opinion.
      2. Use from three to five examples to develop the topic or opinion.
      3. Use transitions when needed.
      4. Include a summary sentence at the end if you wish.
      5. Incorporate a variety of sentences: long and short, simple and complex.

Example: Weather in Montana is erratic. First . . . Second . . . Then . . .

Weather in Montana is erratic. First, it doesn't get cold until December. *Second,* there isn't any snow for Christmas. Throughout January it changes from warm to cold, and in February it snows some more. *Then* in March, it is sixty degrees until the last days when it snows. It is hard to believe weather can change so much in one place.

c. Tell students that their paragraphs need a topic sentence, three to five sentences that support the topic, and a summary sentence.
d. Encourage students to vary the length of their sentences and add additional sentences if appropriate.

3. Have students complete the paragraph and edit their drafts.

Guided Practice

1. Continue using framed paragraphs as a guide until students begin developing their own plans for structuring their ideas.
2. Include a framed essay answer on a test for students to complete.
3. Allow students to become independent writers who no longer rely on the structure of the framed paragraph. Framed paragraphs are only appropriate during the initial stages of writing. Once students have success with different formats, they should begin writing on their own.
4. Students should always have the freedom to choose whether they want to use the framed structure. Always encourage deviation from the format.

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Exhibit 5.27

Framed Paragraph: Science Report: Elementary Level

Use framed paragraphs as a procedure for reviewing science concepts and helping students write laboratory reports. This frame focuses on the essential components of a scientific report: purpose, procedure and results.

Today in science we studied. . . . In our experiment we used . . . and. . . . Our experiment showed. . . .

Exhibit 5.28

Framed Paragraph: Science Laboratory Report: Secondary Level

1. Lab activity title
2. Date
3. The purpose of this lab is to. . . .
4. My hypothesis about the results is. . . .
5. The first procedure is. . . . Second, . . . Third, . . .
6. Data
7. The data shows. . . .
8. After class discussion, I found my data was correct/in error. If in error, the data were incorrect because. . . .
9. My final conclusion is . . . and therefore my hypothesis was . . .

Exhibit 5.29

Framed Paragraph: Science Laboratory Report: Secondary Level*

This sample is from a class of advanced students who design their own lab.

OBSERVATION: After observing (state something unexplainable), I noticed ______________________

____

HYPOTHESIS: I think ______________ (refer to the problem/question) is ______________________ .

An observation that led to this hypothesis is __________________________________ . I intend to prove

________________ by ________________________________ .

MATERIALS
1.
2.
3.

PROCEDURE: (Put in order your plan for proving your hypothesis)
1.
2.
3.

DATA: (Accurate detailed observations of your model and how it works are recorded here. Include visuals such as tables, graphs, mathematical operations, and pictures, along with written observations).

ANALYSIS AND/OR CONCLUSION: (Examine the problem and your hypothesis. Did your data support your hypothesis? Explain why your results supported or did not support your hypothesis.) My problem is

____

____________________ . The results of my investigation are ____________________________

____ . These

results may be caused by ____ .

Therefore, these results did or did not support my hypothesis because ________________________

____

Student sample:

OBSERVATION: After observing hot air balloons, I noticed they have no engines, and yet they stay up in the air.

HYPOTHESIS: I think balloons stay in the air because hot air rises above cold. An observation that led to this hypothesis is that balloons go up more each time the heat source beneath them is ignited. I intend to prove this by studying the air temperature in the classroom and the gym at different elevations before and after adding a heat source.

MATERIALS:
1. 3 thermometers
2. Bunsen burner
3. Yard stick
4. String and paper clips

PROCEDURE:
1. Study the temperature in the classroom
    a. First pick a location in the room away from doors, heat ducts, air vents, and windows.
    b. Fasten the thermometers at three locations: 3″ above the floor, 5′ above the floor, 3″ below the ceiling.
    c. Record the temperatures.
    d. Place the Bunsen burner at the top level and let burn at high heat for 5 minutes.
    e. Record the temperatures.
2. Study the temperature in the gym
    a. Pick a location in the gym away from doors, windows, heat ducts, and air vents.
    b. Fasten the thermometers to three locations: 3″ above the floor, the top bleacher on the main floor, and the top bleacher in the balcony.
    c. Record temperatures
    d. Using people as the heat source, record temperatures at the half time of the basketball game.

DATA:

TEMPERATURES (before heat source)

	1. Classroom	2. Gym
Thermometers		
a. top	71	69
b. middle	69	68
c. bottom	66	65

TEMPERATURES (after heat source)

a. top	74	87
b. middle	70	85
c. bottom	66	78

ANALYSIS AND/OR CONCLUSION: My problem is to determine how hot air balloons stay in the air. The results of my investigation showed that in two different situations, when heat was added to a room the air above the source was heated more than the air at the same level or below, so the hot air must rise. These results supported my conclusion.

Exhibit 5.30

Framed Paragraph: Social Studies

The United States government is based on a system of checks and balances. This system maintains a balance of . . . between. . . . Some of these checks and balances are . . . and. . . .

In summary, our forefather's idea of checks and balances was developed to . . . because. . . .

Exhibit 5.31

Framed Paragraph: Language Arts

. . . , a character from the classic novel . . . by . . . seems to have been a(n) . . . person. An example of this was when. . . . Another example was. . . . Finally, . . . This character . . . always. . . .

Huck Finn, a character from the classic novel, *The Adventures of Huckleberry Finn* by Mark Twain, seems to have been an adventurous boy. An example of this was when he decided to run away from the widow's house where he was staying. Another example was when he and his friend Jim rode a homemade raft down the Mississippi River by themselves. Finally, Huck decided to adventure back to the widow's by himself. This character, Huck Finn, always dared to do exciting things.

Strategy 3: Spool Papers

A **spool paper** provides a system for organizing information through the use of an introductory paragraph containing a definite thesis, supporting paragraphs, and a concluding paragraph. While this procedure may seem rigid, the structure is useful for classroom and real-life situations. It is particularly effective for essay examinations. Once students have generated their ideas for a specific topic, the spool system provides a method for developing those ideas. Again, once students begin to succeed, encourage them to vary the pattern. Allow students the freedom to develop their own systems of internal organization. Sample spool papers are presented in Exhibits 5.35 to 5.38.

Direct Instruction

1. Present the spool diagram illustrated in Exhibit 5.32 on the overhead, and pass out copies of the diagram. Explain that the diagram is a format for developing a paper containing five paragraphs. Note also that the procedure is not necessarily restricted to five paragraphs.
2. Select a familiar topic, possibly from a preceding unit. Brainstorm ideas related to the topic. Model how to narrow the topic to three issues.
3. Collectively develop an introduction. Explain that the thesis is the controlling idea which includes the topic of the paper and the main points developed in each succeeding paragraph. The thesis can be called a power 1 statement and the main points of the paragraphs power 2 ideas.
4. Draft a spool paper using the topics brainstormed. Explain the function of the transition words listed in Exhibit 5.33.
5. Duplicate copies of the paper.
6. Use the spool paper editing checklist from Exhibit 5.34 to evaluate the compositions. Have students outline the content of the paper on the editing checklist.

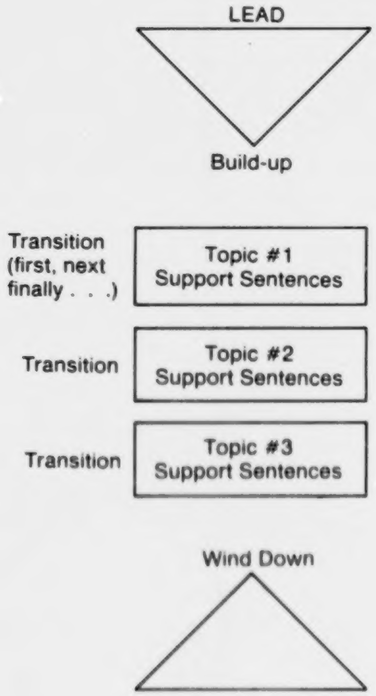
Guided Practice

1. Guide students in brainstorming and narrowing their own topics.
2. Have students draft their ideas into a spool paper outline. (Allow them to use the editing checklist as a pre-writing tool.)
3. Once students have written their first drafts, have them read their papers to other students. Have students work in small groups and react to the papers. Encourage students to make positive comments and to ask questions which might help the writer elaborate on ideas.
4. Then have the students revise their papers.
5. Finally, have students edit their work using the spool paper editing sheet. Encourage students to vary this format if alternative organizational plans result in well-developed and internally coherent ideas.
6. Complete final drafts.

Exhibit 5.32

Spool System Diagram

The spool system is the standard, five-paragraph method of organization. It forces the student to organize his/her writing through use of a thesis sentence that breaks the paper into a logically structured paper with a definite conclusion.


LEAD
Build-up
Transition (first, next finally . . .)
Topic #1 Support Sentences
Transition
Topic #2 Support Sentences
Transition
Topic #3 Support Sentences
Wind Down

Introductory Paragraph: This starts with a **lead** (question, interesting fact, quote, anecdote) to gain the reader's attention. The last sentence in the introduction is the **thesis,** which is the controlling idea and contains the topics for each paragraph in the body.

LEADS:
1. Asks a question
2. States an interesting fact
3. States a quote applying to thesis
4. States a brief story (anecdote)

The thesis sentence (the last sentence of the introductory paragraph) contains the topics for each paragraph in the body.

Body: This should contain at least three paragraphs. In a paper to convince, the weakest reasons should come first; strongest reason should come last.

Concluding Paragraph: This paragraph starts with a **restatement** of the thesis sentence. **"Clincher"** sentence(s) follow, giving the feeling of business completed. These may relate back to the lead.

Exhibit 5.33

Transition Words Useful in Framed Paragraphs and Spool Papers

---

Addition

- again
- also
- and
- and then
- besides
- equally important
- finally
- first
- further
- furthermore
- in addition
- last
- lastly
- likewise
- moreover
- next
- nor
- secondly
- thirdly
- too

Comparison

- in like manner
- likewise
- similarly

Contrast

- after all
- although this may be true
- and yet
- at the same time
- but
- for all that
- however
- in contrast to this
- nevertheless
- notwithstanding
- on the other hand
- on the contrary
- still
- yet

Place

- adjacent to
- beyond
- here
- nearby
- on the opposite side
- opposite to

Purpose

- for this purpose
- to this end
- with this object

Result

- accordingly
- consequently
- hence
- in conclusion
- therefore
- thereupon
- thus
- wherefore

Summary, Repetition, Exemplification, Intensification

- as has been noted
- as I have said
- for example
- for instance
- in fact
- in other words
- in short
- in sum
- in brief
- in any event
- indeed
- on the whole
- to be sure
- to sum up

Time

- after a few days
- afterward
- at length
- immediately
- in the meantime
- meanwhile
- soon

Exhibit 5.34

Spool Paper Editing Sheet

Writer ______________________ Editor ______________________

1. Writer is to number lines.
2. Write only on editing sheet.
3. Only the author has the right to change anything on his/her own paper.
4. Steps in editing
   a. Author reads own paper.
   b. Author reads his/her paper to editor.
   c. Editor reads paper back to author.
   d. Complete editing checklist together by writing or summarizing the author's sentences in each position.

Paragraph 1—Introductory paragraph
a. opening sentence(s):
b. thesis statement:

Paragraph 2
Thesis or topic sentence:
a.
b.
c.
Summary or lead

Paragraph 3
Thesis or topic sentence:
a.
b.
c.
Summary:

Paragraph 4
Thesis or topic sentence:
a.
b.
c.
Summary:

Paragraph 5—Conclusion
a. restating major point of paper
b. clincher

Spelling suggestions:

Sentence suggestions:

Exhibit 5.35

Sample Spool Paper #1

HOW TO WRITE A SPOOL PAPER

by a ninth grade student

Have you ever had trouble writing a composition for class? Well, if you have, maybe the solution to your problem is a spool paper. In order to write a spool you have to have five paragraphs which are all broken down into three main parts. These three main parts are the thesis, body, and the conclusion.

The first paragraph, the thesis, is the paragraph where you tell what you are going to be writing about. You must give three things that make up what you are writing about and tell them in three separate paragraphs. This paragraph is your beginning, or your thesis paragraph.

The second, third, and fourth paragraphs are called the body. These paragraphs must relate to the first paragraph or thesis paragraph. These paragraphs will support your opinion or statement. There must always be three paragraphs to support your thesis. The thesis and the body work together.

The fifth paragraph is called the conclusion. In this paragraph you summarize what you said in your thesis and your body paragraphs. You say what you said in your thesis but in different words.

Now you have the framework for writing a good paper. Remember to start with your thesis in an introductory paragraph. Follow that first paragraph with the body, and three more supporting paragraphs. Finally, you need to include a concluding paragraph. You see, good writing is as easy as 1, 2, 3!

Exhibit 5.36

Sample Spool Paper #2

Dear Santa,

I am writing to you explicitly to let you know what I want for Christmas. Hopefully, you won't make any mistakes this year. So please pay attention to both what I say and why I deserve such gifts. Specifically, Santa, I want you to bring me some new skis, a microwave oven, and a warm fur coat.

First, I desperately need a pair of new skis. As you know, skiing is the most important thing I do in my life. I am, in fact, a much nicer person if I can ski at least once a week. Thus, in order to improve my personality, new skis are an absolute necessity.

Next on my list is a microwave. I have a terrible problem with cooking, which could be solved very easily by a microwave. For example, I always forget to leave food out for my family, which means that there is nothing to cook when I come home. My children are looking a bit pale because they are not getting the most nutritious foods, and we are forced to eat out every night. As you know, eating in restaurants is certainly expensive. A microwave would solve all of these problems.

Finally, I have left the most important item for last. You may not agree, but I really need a fur coat. Remember how cold Montana was when you made your last visit at Christmas? Also, don't you think that I would look stunning in mink? It would go well with my shrink-to-fit jeans, and even more important, all of my neighbors would think I was rich. Showing up my neighbors is very important. Please Santa, don't you think I deserve this final request?

In conclusion, Santa, I want you to know that these small items would make me very happy. Even more important, my happiness would generate happiness in others. In fact, I am not really thinking about myself in asking for these three gifts, but the cheer that it will bring to those around me because I will be more physically fit, my cooking will improve, and I will look very elegant. Thus, it is only logical that I have all three gifts under the Christmas tree on Christmas morning.

Sincerely,

Mrs. Charming

Exhibit 5.37

Social Studies Spool Paper

After the Civil War, the former slaves had many difficulties. They had no way to earn their living. Most of them could not read or write, and former slaves had no political power.

Freedom did not provide former slaves with a way to earn their living. The work that most knew was farm work, but farmers need farmland. Few slaves had the money to buy either land or mules to help work the land. In addition, workers were limited by the Black Codes. These laws prevented blacks from working at jobs which would compete with whites who also needed the jobs.

Another problem for blacks was illiteracy. As slaves, they had not been allowed to learn to read and write. Now they needed to read and write in order to get jobs. While progress towards educating blacks was being made, it did not occur quickly enough to help most earn a living.

Blacks had hoped that political power would help them gain equality. However, Jim Crow laws were established, which made separation of the races legal. The laws provided for separate hotels, restaurants, wash rooms, schools, and other facilities. With this separation, Blacks had difficulty gaining any political power.

It took many years for blacks to recover from slavery. Blacks still have economic problems, but in the early days after the Civil War, blacks had tremendous difficulties. Economic, educational, and political situations all contributed to their problems.

Exhibit 5.38

Science Spool Paper

Herpes is an extremely dangerous disease. The disease continues to spread and has been linked to cancer. In addition, there is no sure way to control the disease.

Herpes is spreading rapidly through our population. Herpes will infect over a half a million Americans this year alone. It is even more widespread than gonorrhea. Any person who is sexually active has a chance of getting the disease.

Herpes has been linked with cancer of the cervix. Over 16,000 women have cervical cancer, and about 7,400 die each year from cancer. Herpes may cause some of these deaths.

Finally, there is no known cure for herpes. Not having sex is the only way to keep from having the disease. There is medicine to treat the symptoms, but no medication to cure the disease. Scientists seem to be far from even making a breakthrough in coming up with medication.

Herpes will continue to be a terrible menace for millions of Americans. People who now have the disease will have to adjust to their problems. Until a cure develops, there is no way to keep from contracting the disease for people who are sexually active. Herpes will continue to be a problem for millions of people.

Strategy 4: RAFT

The most common writing assignment, particularly in the content areas, is an essay written by students for the teacher. However, when students write for teachers, they do not understand the need to explain the topic either very clearly or very completely. On the other hand, teachers often choose topics that are too broad in scope.

When assignments are specific and well-focused, writing is not only more enjoyable for students; it also inspires students to learn more content material. **RAFT** is one method which we have used successfully in our content classes for structuring assignments. It is a procedure developed by Nancy Vandervanter, a junior high English teacher who participated in the Montana Writing Project (Adler, 1982).

RAFT is a system for making sure that students understand their role as writer, their audience, the format of their work, and the expected content. These key ingredients are included in every writing assignment:

R: *Role of a writer:* who are you? a soldier, Abraham Lincoln, a slave, a blood cell, a mathematical operation? Other possible roles are listed in Exhibit 5.39.

A: *Audience:* to whom is this written? a mother, Congress, a child? Possible audiences are listed in Exhibit 5.39.

F: *Format:* what form will it take? a letter, speech, obituary, conversation, memo, journal? Possible formats are listed in Exhibit 5.40

T: *Topic + strong verb:* Persuade a soldier to spare your life; demand equal pay for equal work; plead for a halt to coal mining in our valley.

Practically all RAFT assignments are written from a viewpoint other than that of a student, to an audience other than the teacher, and in a form other than the standard theme. Seldom do we use the word *write* in our assignments, but choose rather to incorporate stronger verbs such as *plead, convince,* and *clarify,* all of which focus the assignment by setting the tone of the response. Sample RAFT papers are presented in Exhibits 5.41 to 5.47.

Direct Instruction

1. Explain that all writers must consider four components of every written assignment: role, audience, format, and topic.
2. Brainstorm ideas about a topic. Select several topics from those presented.
3. Write RAFT on the board, and list possible roles, audiences, formats, and strong verbs that are appropriate for each topic.
4. Have students write on one of the generated assignments.

Guided Practice

1. After discussing a topic, have students come up with their own RAFT assignments.
2. Use RAFT assignments at the beginning to determine the students background knowledge or at the end of a unit to summarize main ideas and concepts.

Exhibit 5.39

Roles and/or Audiences for Writers

---

ad agencies
administrators
another school
artists
athletes
businesses
cartoonists
Chambers of Commerce
characters in short stories and novels
charities
classical musicians
colleges
community figures
corporations
dancers
doctors
drama clubs
ecologists
editors
elderly individuals
historians
historical figures
homesteaders
hospital patients
journalists
lawyers
local politicians
movie stars
museums
national politicians (past and present)
newspaper editors
older students
other classes
parents
pen pals
poets
publishers
radio stations
relatives
restaurants
rock stars
salespersons
scientists
social leaders
stores
teachers
theaters
travel agencies
TV characters
TV stations
writers
younger students

Exhibit 5.40

Formats for Writing

The following list offers teachers and students only some of the formats for writing. In the RAFT strategy, the possibilities are endless.

- acceptance letter
- advertisement
- advice
- apology
- application
- autobiography
- book jacket
- bumper sticker
- caption
- cartoons
- children's story or poem
- commercial
- complaint
- confession
- congratulations
- contest entry
- dialogues and conversations
- dictionary entry
- dramatic monologues
- editorial
- epitaph
- essay
- eulogy
- expense account
- farewell
- fiction
- film
- flyers
- graffiti
- human interest story
- inaugural speech
- inquiry
- interviews
- invitation
- job specification
- jokes
- journals and diaries
- legal brief
- letter to the editor
- letters
- list
- magazine
- marriage proposal
- math notes
- memos
- message to future
- metaphors
- minutes of meeting
- monologue
- news story
- nominating speech
- obituary
- observation papers
- pamphlets
- petition
- photo essay
- photos and captions
- placards
- play
- poetry
- posters
- prayer
- profiles and portraits
- promotional brochure
- prophecy and predictions
- protest
- psychiatrist
- public statements
- public notice
- radio play
- radio scripts
- recommendation
- record album covers
- rejection
- reminiscences and memoirs
- requests
- resignation
- resume
- reviews
- riddles
- satire
- science notes
- sermon
- ship's log
- sketches
- skits
- slide show scripts
- slogans
- sound tapes
- suicide note
- sympathy
- telegrams
- telephone dialogue
- travelogue
- TV script
- undercover report
- wanted poster
- war communique
- warning
- will
- written debates
- yearbook

Exhibit 5.41

Fifth Grade History RAFT Paper

R A colonist in America in 1608.
A A friend in England.
F Letter
T Conditions in America

Jamestown, December 3, 1608

Dear Sir Charles,

It has been 15 long, long months since we arrived in the New World. We have had terrible troubles since we arrived. Eighty-two men died during the cold winter season of diseases and starvation. If you would kindly send more food to the New World, we might survive. Also, please send more fire arms for hunting and self-protection. Indians inhabit our land, and I have a feeling they might attack us.

Thank you,

Geoffrey P.

Exhibit 5.42

Social Studies RAFT Assignments

A. Draw a political cartoon depicting a political viewpoint about the 1968 Convention riots in Chicago. You can show Mayor Daley's role in these riots and/or the chaos inside the convention hall. Or, feel free to choose a topic related to political "boss" Daley.

B. You are a journalist for a weekly news magazine. You were assigned to cover the 1968 Democratic Convention. You were beaten by a Chicago policeman during the demonstrations outside the Convention Hall. Write a letter to the editor of the *Chicago Sun Times*, complaining about police behavior during the demonstrations.

Exhibit 5.43

Science RAFT Paper

R Water drop
A Parent
F Travelogue
T Explain the travels of a water drop through the water cycle

Once, long ago, I was a little raindrop named Rose. I was floating around in the lake one day when my boy friend, Kip the cloud, came riding by. He invited me for a ride. So, with the help of the sun, I turned into water vapor and drifted on up. We headed up the hill to the new pub by the river where Kip proceeded to get cold. He dropped me for a new drip and headed back out to the lake. I had to hitch a ride with the river, but finally made it back to the lake. "Look, here comes Thad, the thunder cloud!"

Exhibit 5.44

Auto Mechanics RAFT Paper

R Your name is Robert B. Bearing. Somehow you have gotten loose and into a fully synchronized three-speed manual transmission.
A Yourself
F Journal
T Explain your destructive tendencies, and what happens to your other tranny friends. Use your books and the manuals for information.

I, Robert B. Bearing, was rolling along inside this transmission, doing my job, when all of a sudden I broke out of the bands that encased me. At first, I didn't know what to do. Then I realized I was free. I no longer had to work by force. I could do what I wanted.

I was floating around in all of the lubrication when I was picked up by a steel gear. I started to roll through the second and high gear synchronizer assembly. I started breaking the synchronizer teeth off. I started to slip away, when I was grabbed by another gear. I started breaking him up good. He let me go, and I took off so fast, I ran into a snap ring and broke it up. I soon noticed a few other pieces of metal floating by me. I flew into the other gears and chewed them up. I was breaking blocker rings, snap rings, and thrust washers.

I finally got thrown into the casing, and put a large hole in it. I flew out the hole after I had broken it. I knew that the transmission wouldn't last. I knew it would seize up, or twist all the shafts and gears out. I got out just in time. I heard a loud noise up ahead. I rolled down the road, and saw the tranny laying in the road with the car stopped five feet in front of it. The tranny had the output shaft broken off and the input shaft was gone. I didn't care, because I was now free.

Exhibit 5.45

Mathematics RAFT Paper

R Student
A Diary
F Entry
T Explain to your diary how to add fractions

Dear Diary: November 26

Today we just learned how to add fractions. It was simple. If you don't know, I'll tell and show you how to do it. First, you get two fractions like $\frac{3}{12}$ and $\frac{1}{4}$. Now you have to find a common denominator. The common denominator must be able to divide evenly into the fractions' denominators, so we'll use 12. So we got

$$\begin{array}{rl} & \frac{3}{12} = \frac{\quad}{12} \\ + & \frac{1}{4} = \frac{\quad}{12} \end{array}$$

because 4 and 12 go into 12. Now 4 will go into 12, 3 times, so 3 times the numerator is three and you get $\frac{3}{12}$. Now 12 will divide into 12 once. $1 \times 3 = 3$ so you get $\frac{3}{12}$. Now add the new fractions $\frac{3}{12} + \frac{3}{12}$ and you get $\frac{6}{12}$. The denominator stays the same, but you have to reduce. Six will divide into 12, 2 times and 6 will divide into 6 once, so it is $\frac{1}{2}$.

Exhibit 5.46

Mathematics RAFT Paper

R point
A teacher
F letter
T convince your teacher that you have an important function

Dear Mrs. Havens,

I am Pete the point. I am a point of an endless number of points in space. I want to ask you if you will teach your students about us points and how every single geometric figure is made of us. It is very important to me because it seems that many people think of the point as a small part of geometry since it is so little. Though we are little, we are one of the most important factors of our world of geometry. Without me and all other points there would be no other geometric figures. We are their building blocks. Though all lines are drawn with one solid mark, in reality a line is an endless set of points going in opposite directions. A sphere is a figure with all points at an equal distance from a center point like me.

So please tell your students all about us points. It troubles me when many think of us as unimportant specks in space. Please spread the reality of our importance to the students you teach. My partners and I would appreciate it greatly. Thank you.

A point,
Pete

Exhibit 5.47

Biology RAFT Paper

R blood cell
A you
F travelogue
T Describe your function and travels through the circulatory system.

Hello, I am your red blood cell. I am here to tell you about the most exciting things that I have been through. First of all, I will tell you a few things about me.

I am a cell in your blood. I carry oxygen and carbon dioxide. I am quite small. If you were to put me in a row of one hundred and fifty cells, I'll only be one mm long. That would be as wide as your pencil lines. I am round with thick edges and a thin center. That's enough about me. Now on to the fun things I do.

I am like a delivery man. I help with the blood's job of being a pickup and delivery service, but I have lots of fun. The oxygen gas that comes into the lungs is picked up by me as I pass through the capillaries in the lungs. The lung is the best part of the trip. I splash around in the lung. At the same time carbon dioxide gas is already present in me, and I'm lost somewhere in the lung. I perform the job of pickup and delivery so well.

Now I'm on my journey again; on my way to the heart. It is going to be a very slippery ride up and down and around curves in and out of valves of the heart. Have you ever heard your heart beat? It goes bomb, bomb. It sounds like a door closing. It makes a lot of noise, but you will enjoy yourself going through the heart. The different parts are very interesting.

Now on to the blood vessel. The blood vessel is a very wet'n wild place to be. If one of the blood vessels becomes clogged, that makes it difficult for the heart to pump blood through the vessels. Now on with the show. Now to the cells. These are some of my buddies. I was traveling down the highway of blood and I got pulled over by one of the cops. I'm not sure but I think it was Cindy the cell. She got into a conversation about her job keeping the bad cells off of the streets.

There are two different kinds. There are me, of course, the red cells, and there are my good friends the white blood cells that remove dead cells and microbes. They are like the people in charge of funeral homes. My good friends the white cells are very different from me and my family, the red cells. They have nuclei, are larger, and have a shorter life span.

Now let's slide over to the platelet's apartment. Now that was a bumpy ride but I did get there. The platelets are cell-like parts in the blood that help in forming a blood clot.

Well, I have to go, my red and white buddies are calling me to slide around with them.

Summary

In this chapter we explored different ways for students to organize and remember content. In Part One we presented three different forms of notetaking: two-column notes, problem solution, and opinion/proof. Our central message is that students must organize information from their reading, and their plans should vary according to their goals and the materials. Two-column notes are useful whenever the materials and the task requires chronological or linear retention of a considerable amount of information. With problem-oriented topics, we find two-column notetaking less effective than other plans such as problem/solution notes and opinion/proof. As teachers, we must model options and teach for competence in these options so that students have the confidence to develop their own unique plans.

Part Two focused on four approaches to writing: journals, paragraph frames, spool papers, and RAFT. Paragraph frames and spool papers provide very structured formats for writing about content information, while journals and RAFT allow students much more personal freedom. Entice students with a variety of writing experiences. The exact assignment is far less important than the general goal of having students write often about content. Students learn what they write, and they learn to write by writing. The content areas provide a rich arena for writing.

BEST COPY AVAILABLE

CHAPTER 6

Vocabulary

Words communicate content. If students do not know the vocabulary of a content area, they will never understand the content. There is a strong relationship between reading comprehension and vocabulary (Bormuth, 1966; McKeown et al., 1983).

Content vocabulary produces unique challenges. Most content texts contain many unfamiliar words, and the sheer quantity can be overwhelming. For example, read these sentences taken from a botany text: "The most notable thing about cells is their compartmentalization into membrane-bounded organelles. The protoplasm itself is bound externally by the plasmalemma." As you can see, many content books read like a foreign language. While most students can pronounce unfamiliar words such as *organelles* and *plasmalemma*, few know what the words mean. Yet, knowing the appropriate meanings for key words in the text is one of the prime determinants of reading comprehension. Without this knowledge, comprehension remains superficial.

Building knowledge about concepts takes time. We know that students learn most effectively through real experiences with what a concept represents. For example, the best way to understand a desert is to experience personally what a desert feels like, observe its animals and vegetation, feel the heat of day and cool of night, and to run across the expanse of sand. Our concept of a desert grows with each visit. Developing rich concepts takes time and repetition.

Obviously, we cannot always teach through first-hand experiences. However, our students can learn about the Sahara Desert through vicarious experiences portrayed in pictures, movies, and television. Bringing the world into the classroom is the key to successful vocabulary instruction. Watching films, working with manipulatives in mathematics, completing laboratories in science, and acting out dramatic scenes from novels build concepts underlying new vocabulary.

Thus, whenever teaching new concepts, we must consider ways for the students to experience meaning. We must also keep in mind that teaching for conceptual meaning follows the same generic patterns as effective instruction in comprehension. Activate students' background knowledge, engage them energetically in learning, and help them understand how to learn new concepts on their own.

Help students understand ways to activate their own **background knowledge** about a new concept. Our students can begin to understand a new concept through learning about how the concept relates to what they already know. Always begin vocabulary lessons with questions focusing on the known. Talk about the importance of this step. Tell students to do similar brainstorming on their own. So the process is internalized, explain that brainstorming the known is important for learning. Reinforce this behavior until it becomes a part of their own strategic behavior.

Effective learning is also characterized by **active student involvement.** The harder one works, the better one's retention. Telling students definitions takes far less student effort than having students construct their own explanations. The more students are involved, the stronger is the learning. Help them understand why they must think about and actively use new words in order to make them their own. Whenever possible, move vocabulary instruction from a teacher-directed to a student-centered situation. Again, make sure students understand why being self-engaged is a more powerful approach to learning than teacher-directed activities.

Basic to this entire discussion is the idea of teaching **student independence.** Effective instruction helps students develop strategies for acquiring new vocabulary independently. After all, we have only a brief influence on our students' careers as life-long learners. We must show students how to learn on their own through a variety of procedures.

While building in-depth experiences, engaging background knowledge, encouraging active student involvement, and teaching for independence are ideal instructional parameters, classroom realities often constrain the ideal. Because of the overwhelming number of new concepts presented in content materials, teachers simply do not always have the time for rich development of each new term. Thus, the content teacher must continually compromise by teaching some words thoroughly and treating other, less important words more superficially. Before students read an assignment, the teacher must make some instructional choices, allocating a few words for thorough instruction.

To summarize, thorough instruction of essential vocabulary follows a generic plan where students first begin with the known. They brainstorm what they know about a word. If the concept is unfamiliar to the student, teachers must provide background knowledge to build a conceptual foundation. Students then need to become actively engaged in reading, talking, and writing about their new knowledge.

For convenience sake, the instructional procedures described in this chapter have been separated into various strategies. In actuality, the procedures are overlapping. The ideas presented in the first section (Word Maps and Charts) can be readily integrated with many of the suggestions in the next three parts: contextual analysis, writing, and structural analysis. Some approaches are far richer because they integrate the essentials of thorough instruction; others are more appropriate for providing an introductory familiarity with words.

Part 1: Word Maps and Charts

Word maps and charts help students understand the components independently (Strategy 1). Organizing concepts into categories (Strategy 2) and hierarchies (Strategies 3 and 4) challenges students to discover relationships among ideas and words. Word charts (Strategy 5) provide a format for noting interrelationships among key concepts, minor ideas, and vocabulary.

Strategy 1: The Concept of Definition

The logical place to begin vocabulary instruction is to teach students the **qualities of a definition.** Too many students have a narrow conception of what the meaning of a word encompasses. Most conceive definitions as simple, dictionary-like statements characterized by little elaboration and personal comment. Schwartz and Raphael (1985) have designed an instructional approach for teaching students a broader concept of a definition, one which encourages them to personally integrate their own knowledge with a concept. Once students understand the qualities of a definition, they apply this general knowledge in order to expand their own vocabularies and to master unfamiliar concepts.

Schwartz and Raphael recommend using a simple form of a **semantic map** to help students visualize the components of a definition. The map includes three relationships essential to a rich definition: (1) What is it? (2) What is it like? (3) What are some examples? (See Figure 6.1)

Direct Instruction

1. Explain to students that to understand new vocabulary, they need to know what makes up a definition of a word. Go over the three questions that make up a definition.
2. Show them the word map, and describe its parts.
3. Begin with a familiar concept such as "ice cream."
4. Ask, "What is it?" (food, dessert) Write these descriptors on the map. (Tell students that their answers will be general.) Next ask students "What is it like?" Record responses on map (cold, creamy, delicious, soft, hard, etc.). Explain that these qualities are properties that differentiate ice cream from other foods and desserts.
5. Finally, ask for examples (chocolate, vanilla, Haagendaz, Schwann's, etc.)
6. Have students work through several other examples.

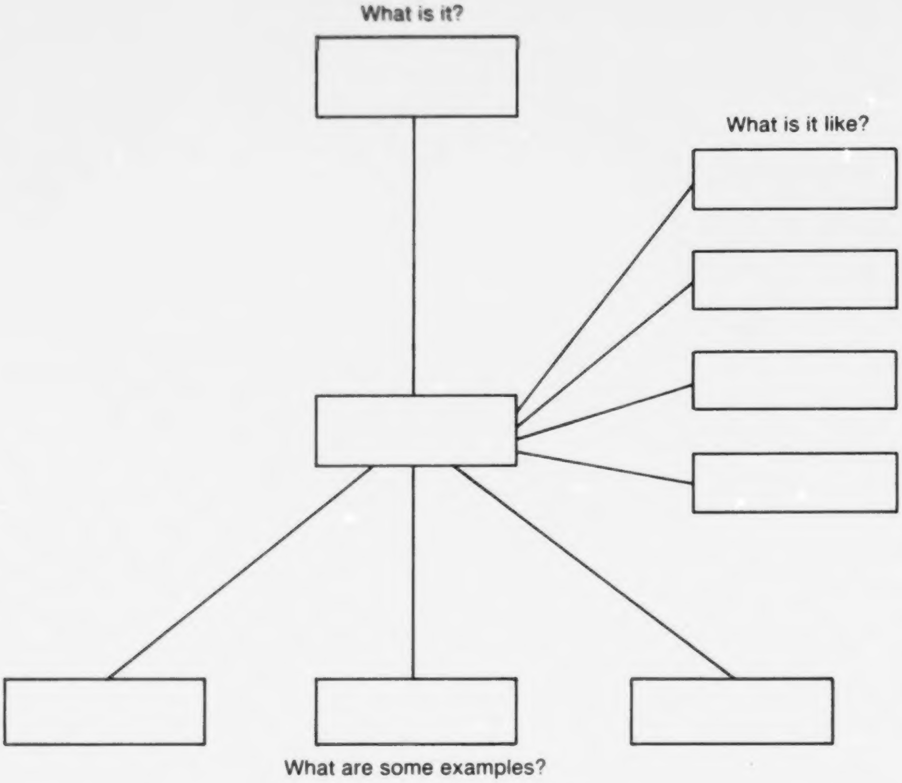

What is it?
What is it like?
What are some examples?

Figure 6.1 Word Map Format

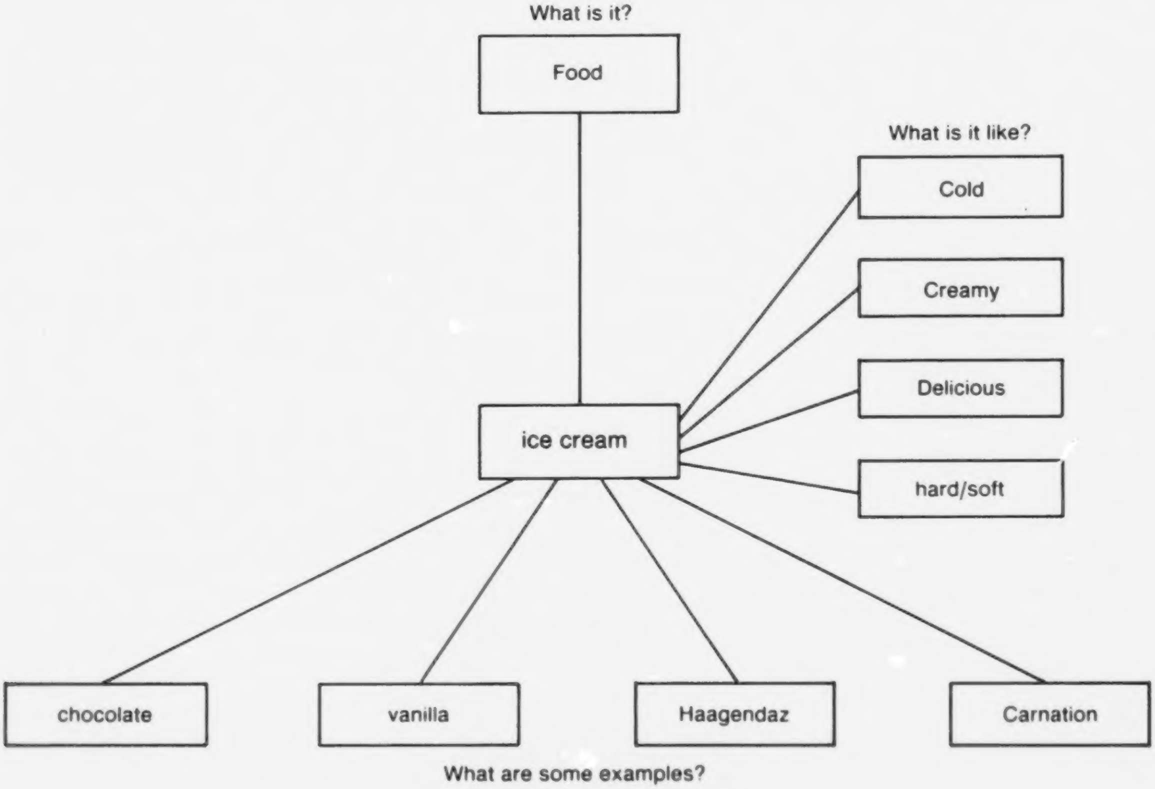

What is it?
Food
What is it like?
Cold
Creamy
Delicious
ice cream
hard/soft
chocolate
vanilla
Haagendaz
Carnation
What are some examples?

Figure 6.2 Example Word Map 1

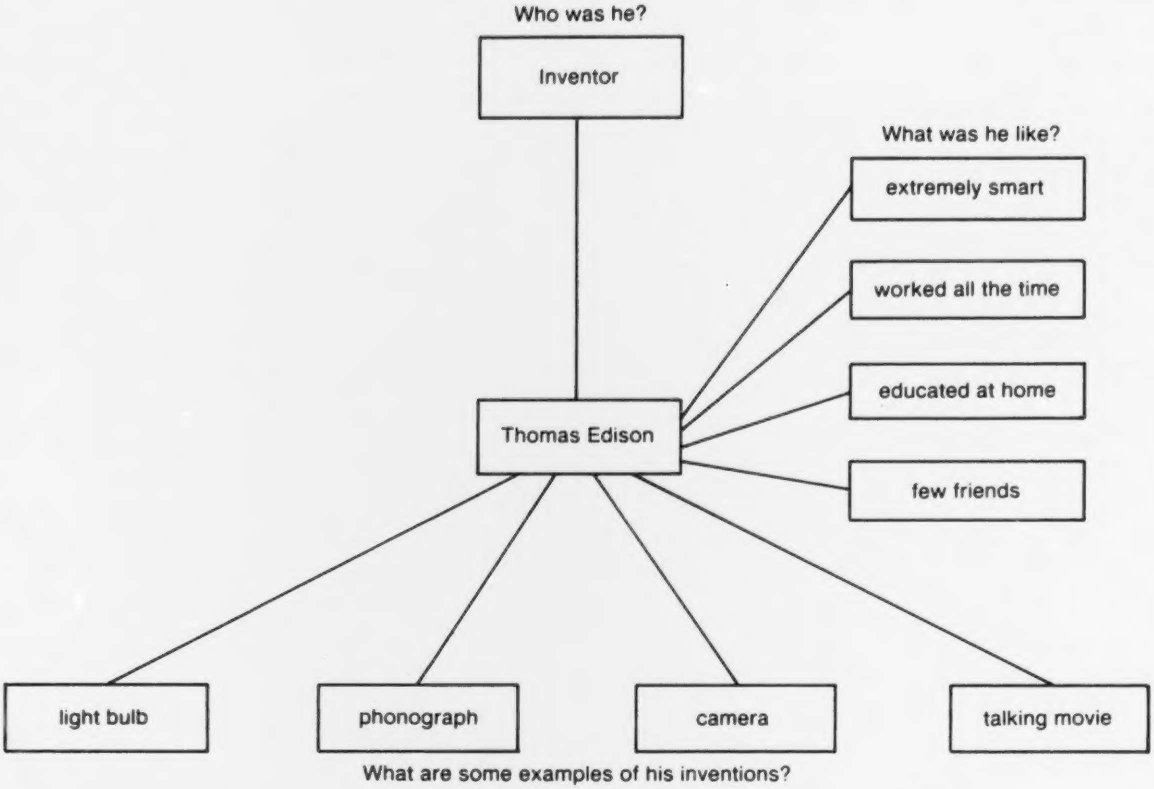

Who was he?
Inventor
What was he like?
extremely smart
worked all the time
educated at home
few friends
Thomas Edison
light bulb
phonograph
camera
talking movie
What are some examples of his inventions?

Figure 6.3 Example Word Map 2

7. Then tell the students to read a short selection in their text. Together, create a concept map. For example, let's say the assignment was to read a selection on Thomas Edison. The questions are changed to reflect a person. The map might appear like the map in Figure 6.3.
8. Encourage students to add more information or less, depending upon the concept they are defining.

Guided Practice

1. Before students read, list key vocabulary words on the board. As part of the prereading discussion, brainstorm what students already know about the topic, using the vocabulary map. After students read, have them fill in additional information. Have students present their maps for discussion. No two maps should be quite the same.

2. Provide students with the word or concept, followed by a list containing words or phrases which fit in the surrounding boxes. Have the students try to figure out which items could fit in each category and defend their answers. Examples you might use:

   Soup
   chicken noodle
   served with sandwiches
   tastes good
   bean with bacon
   eat with a spoon
   food
   clam chowder
   served in a bowl

   Computer
   has a memory
   Apple IIC
   a machine
   has a keyboard
   IBM-PC
   people use it to write with
   TRS-80
   can play games on it

3. Have students find the components of the definition from sentences where the word occurs. Exhibit 6.1 is a "complete context" vocabulary map since it contains all the parts of a mapped definition. Exhibit 6.2 is a "partial context" vocabulary map since some of the components are missing. Have the students revise Exhibit 6.2 to include the missing information.

Exhibit 6.1

Complete Context Vocabulary Map

Of all the furniture in our house, I find I like chairs the best. Whenever I have a good book, I like to sit in our big lounge chair with my head on one arm and my legs draped over the other.

More than reading, I like eating! Our dining room chairs make eating much more fun than standing in the kitchen over the sink. Even my little brother likes chairs. He can eat, play, and throw things all from the same convenient location, his high chair.

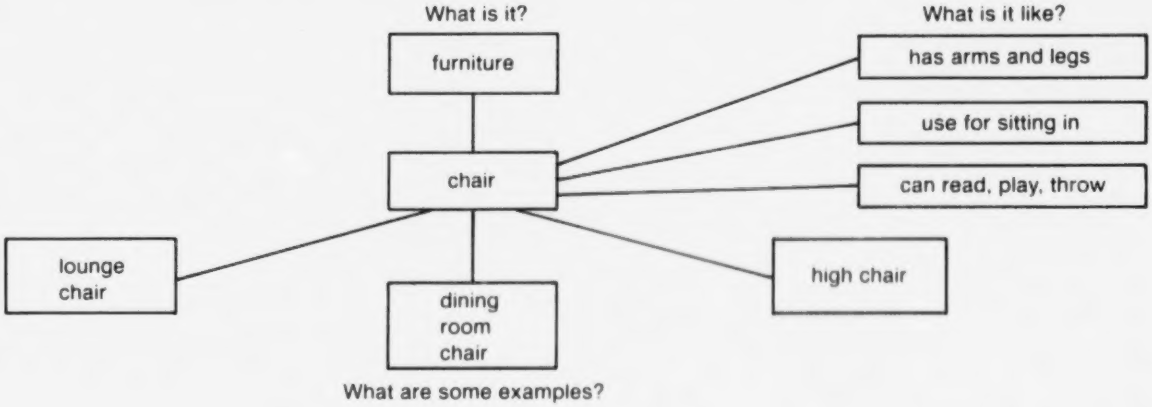
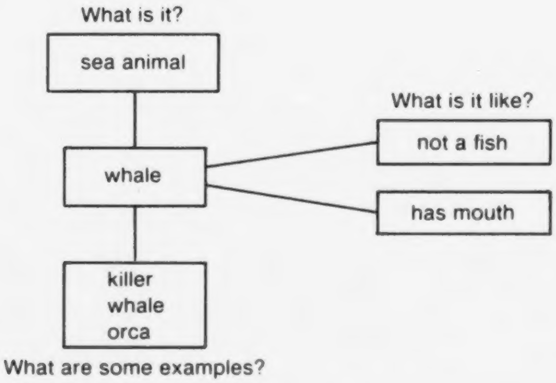

What is it?
furniture
What is it like?
has arms and legs
use for sitting in
can read, play, throw
chair
lounge chair
dining room chair
high chair
What are some examples?

Exhibit 6.2

Partial Context Vocabulary Map

Sea World in San Diego is a fascinating place filled with all sorts of unique sea animals. One of the most popular mammals (one that many people wrongly classify as a fish) is the whale. During one of the shows, a trainer rides on a killer whale, or Orca. She feeds it by hand, and even puts her hand in its mouth.


What is it?
sea animal
What is it like?
not a fish
has mouth
whale
killer whale orca
What are some examples?

4. Have students write their own descriptions of concepts. Before they write, they must brainstorm information for the three map components. They may need to do some research to complete the maps. Direct them to include information in their written explanations about what the concept is, what it is like, and to include examples.
5. Have students map various words or concepts and, using complete context, then develop their own definitions.

Strategy 2: Categorization

Categorization is a process by which the special terminology of a content area is organized into related groups. The purpose of this type of exercise is to enable students to see how new concepts are related. In a sense, new terms are placed within a specific concept "environment." Since students may already have some background knowledge about the concept environment, categorization provides a way to integrate new information with what is already known.

Direct Instruction

1. List words from a chapter, unit, or story on the board or overhead.
2. Review the words with students in a class discussion.
3. As a class, organize words into categories.
4. Come up with a category label, or power 1, for each category.

Guided Practice

1. Have students write vocabulary words on 3 × 5 cards (one word per card).
2. Students work in groups to organize words into categories.
3. Encourage students to organize words in a variety of different ways. In class discussion, have them justify each arrangement.
4. Another approach is to provide the students with category labels and a list of power 2 words. Students organize words under the appropriate label. This method is demonstrated in Exhibit 6.3.

Exhibit 6.3

Mathematics Categorization

Directions: The following words are all found in mathematics word problems. They are considered to be key words that indicate the need to perform one or more operations. The four operations and equality specify the categories into which each word fits. Place each word under the operation or equality which it suggests:

totals
sum
minus
difference
add
times
is
twice
divided by
left over
subtract
altogether
more than
product
plus
half
will be
less

Addition	Subtraction	Multiplication	Division	Equal

Strategy 3: Pre-Reading Brainstorming, Categorizing, and Mapping

In **pre-reading brainstorming, categorizing, and mapping,** the teacher begins a lesson by probing students' background knowledge about a certain topic. What results is a semantic network that students organize. After reading the assignment, students enrich the network with additional information.

Direct Instruction

1. Begin with a general topic such as the Declaration of Independence.
2. Have students brainstorm ideas associated with the topic. For example, they may connect the Declaration of Independence with July 4, 1776, trade embargo, Thomas Paine's *Common Sense,* Henry Lee, Thomas Jefferson, British attacks on the Maine coast.
3. After discussing each meaning, the teacher helps students categorize their terms into subtopics. Example categories for Declaration of Independence might be the contents of the document, events leading to its development, people involved, results.
4. Next, the teacher introduces any new terminology, which students then organize into the appropriate category (Figure 6.4).
5. After students read, add additional information to the map.

Guided Practice

1. Divide students into groups.
2. Place a key concept on the board.
3. Choose a leader for each group.
4. Groups brainstorm what they know about topic, and then categorize information.
5. Students preview their assignment and add additional information.
6. Students read and then revise their maps.
7. Each group prepares an oral report or writes a summary based on its map.

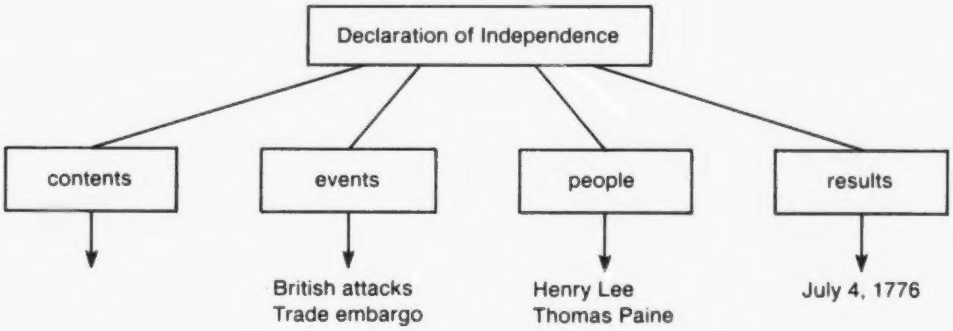


Figure 6.4

Strategy 4: Post-Reading Brainstorming, Categorizing and Mapping

In **post-reading brainstorming, categorizing, and mapping,** have your students arrange words and phrases categorically and hierarchically to represent the relationships among ideas. While it is necessary to give students some guidance at first, these overviews are most effective when created by students rather than teachers.

Direct Instruction

1. After the students have read an assignment, brainstorm key vocabulary contained in the selection.
2. List the words on the board. These will be power 3 items.
3. Discuss different ways to categorize the words.
4. Label each category. The categories are power 2s.
5. Come up with a main idea, or power 1, for all of the categories.
6. Demonstrate how to organize all of the categories into a hierarchical arrangement beneath the main point or topic. The main point is a power 1.
7. Add additional higher order or subordinate ideas as appropriate.

Guided Practice

1. Mapping can be used to help students survey a text chapter. Have your students preview their assignment and write down the information in titles, headings, and summaries. Instruct them to skim for italicized or bold print vocabulary and record the terms they find. Divide the class into groups of four or five students and have them generate maps from the information they have found. Then have students read the selection and revise their maps.
2. As students read, have them record key ideas and vocabulary on cards. When they have completed the reading, have them review by organizing the ideas logically into a structured map.
3. Have students use their maps as a pre-writing tool for writing summaries of reading assignments. Ideas higher in the hierarchy become main points. The examples in each category become the supporting details.

North Sea
Russian Empire
German Empire
Austria Hungary
Blk Sea
Bulgaria
Italy
Albn
Med Sea

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Exhibit 6.4

Post-Reading Vocabulary Categorizing and Mapping

1. Students wrote the following words on cards:

SAS
vertical
congruent
scalene
division
corollary
acute

bisect
obtuse
isosceles
supplementary
equiangular
postulate
triangle

theorem
ASA
sides
transitive
equality
SSS
SAA

equilateral
angle
midpoint
perpendicular
definition
reflexive
addition

2. Students worked in small groups and arranged the words into logical categories.
3. Each group explained arrangement to class and compared other groups.
4. Each group copied arrangement on large sheets of paper, which were displayed in room.

Student Example

(sides)		*Triangles*	(angles)
scalene			equiangular
isosceles			right
equilateral			obtuse
			acute
Postulates		*Theorems*	*Definitions*
SAS		*Corollary*	bisect
SSS	of congruence		midpoint
ASA			perpendicular
SAA			
reflexive			vertical
addition	of equality		supplementary
division			
transitive			

Strategy 5: Charting, Using Semantic Feature Analysis (SFA)

Semantic Feature Analysis, or **SFA** (Johnson & Pearson, 1984) is a procedure which students use to link key vocabulary to the major ideas contained in a content selection. The procedure helps both teachers and students select only those words that are essential to developing the major concepts in a selection. Students then learn to understand the relationships among the words and the key concepts in a selection.

Semantic Feature Analysis is well-grounded in research (Anders and Bos, 1986). Students use background knowledge, become actively involved in relating ideas, and, with practice, can learn to use the procedure independently. More importantly, the strategy leads to improved learning, particularly for reading disabled high school students (Anders & Bos, 1986).

Direct Instruction

1. After students have read a selection, have them brainstorm the main topics and vocabulary from the selection.

2. For example, let us say our students have read an article on the 1920s. The article describes the 1920s as a transitional time characterized by political unrest, economic problems, and a shift in the United States from an agrarian society to a more industrialized nation. The article points out the political scandals of the era, and presents information about the people of the era. From this hypothetical article, the key ideas and related vocabulary might be as follows:

   transition era*
   Teapot Dome
   Prohibition
   political unrest*
   Economical changes and problems*
   industrialization
   Charles Lindbergh
   Chicago gangsters
   movie stars
   charleston
   people disillusioned*
   bootlegging
   mass production
   scientific advancement*
   electronics
   aviation
   Albert Einstein

3. Through class discussion, have the students decide which of the brainstormed topics represent major ideas from the selection. Note these items with asterisks(*). These major ideas become the chart's horizontal categories. Minor ideas and words are listed vertically on the chart.

4. Discuss relationships between major ideas and minor ideas. A plus (+) represents a positive relation, a 0 indicates no relationship, and a minus (−) indicates a negative relationship. Use question marks (?) to note lack of concensus and a need for further information (Anders & Bos, 1986).

	Scientific Advances	Transitional	Political Unrest	Economic Problems	Disillusionment
Teapot Dome	?	+	+	0	+
prohibition	0	+	+	−	+
industrialization	+	+	0	+	+
Charles Lindbergh	+	+	−	0	−
Chicago gangsters	0	+	−	−	+
movie stars	0	+	0	0	+
charleston	0	+	0	0	+
bootlegging	?	+	+	−	+
mass production	+	+	0	−	+
electronics	+	+	0	−	−
aviation	+	+	0	−	−
Einstein	+	0	?	0	+

5. Have students substantiate their decisions for the various markings.

Guided Practice

1. After students have read a selection, divide them into groups. Have each group decide upon the major and minor ideas.
2. Students list major ideas horizontally and minor ideas vertically on their charts, and mark +, −, 0, and ? relationships.
3. Each group then presents their decisions and defends them to the class.

Part 2: Contextual Awareness

Students must become consciously aware of the author's craft in developing word meanings. Many authors provide clear definitions and examples of new vocabulary within the **context** of the selection. Yet, even when contextual information is explicit, students often by-pass it. We need to help our students understand the fact that context is an important means for developing vocabulary independently. Much instruction can be done informally, through discussion and exercises focusing explicitly on contextual usage.

The instructional procedures presented in this section will help students become more aware of how an author uses context to define concepts. In teaching these techniques the focus is not on providing a rich and thorough understanding of a particular concept but on the author's use of context. You will need to embellish these context suggestions with other instructional procedures when your goal is to teach essential concepts more thoroughly.

Direct Instruction

1. Begin by explaining that authors use context in different ways to explain new vocabulary. Authors usually have a fairly consistent style of presentation, and if students are aware of the author's craft they can use it to figure out unknown words. The guidelines in Exhibit 6.5 explain the variety of ways authors use context.
2. After talking about the contextual clues that authors use, have students analyze how the author of their own text uses context to explain new terminology. Provide photocopies of a reading assignment containing many unfamiliar words, and make yourself a transparency of the selection.
3. Read through the selection, and model how you analyze context to understand new vocabulary. Talk about the types of contextual clues the author uses. Exhibits 6.6 to 6.9 are examples of contextual analysis exercises.

Guided Practice

1. Have students discuss how they used the author's context to figure out new words.
2. Turn vocabulary instruction over to a committee of students. Photocopy a selection. Have the students underline difficult words. Then the committee demonstrates for the class how they use context to determine the meaning of the underlined words.
3. Photocopy selections with key concepts underlined. Instruct students to underline contextual information explaining the concepts. Then have students create their own definitions derived from the context clues they underlined.
4. Students may wish to create vocabulary cards. Have them write words on one side of the card and the definition and sentence using the word on the other side of the card.
5. Or, you might want to use a more formal approach where students record a variety of information on a notecard. The steps outlined in Exhibits 6.9 and 6.10 can inspire a vocabulary building campaign.

Exhibit 6.5

Contextual Guidelines

The author of your book undoubtedly uses context to develop new vocabulary. Before analyzing how the author uses context, read the following discussion about the most common contextual clues. This information can serve as a guide for analyzing the clues in your book.

Direct Definition: Context clues classified as **direct definition** typically have the word taught as the subject of the sentence. The subject is often followed by a linking verb and the definition.

a. A *metaphor* is an implied meaning.
b. *Corporation* means a business owned by stockholders.

Restatement: We classify context clues as **restatement** if the word being taught is explained through an appositive or by some direct "signaling" by the author. Some examples of "signal" words are *that is, appear as,* and *in other words.* This type of context clue is frequently used in newspapers.

a. Political speeches are full of *loaded words,* that is, words that have favorable or unfavorable connotations for almost everyone.
b. *Parasites,* organisms living at the expense of another, are found on many plants.

Example: **Example** context clues use a fact or incident to explain a concept. With examples, inferential thinking is also required. The reader must understand what the items have in common before arriving at the generalized meaning expressed by the concept.

a. 1, 3, 5, 7, and 9 are all *odd* numbers.
b. A list of North American *predators* might include grizzly bears, mountain lions, wolves, and foxes.

Contrast: Context clues categorized as **contrast** explain a concept by what it does not mean. Be aware of the author's signal words, such as *instead of, rather than,* and *on the other hand.* Then, reverse the definition to understand the vocabulary word.

a. Instead of being pleasant and agreeable, the British and the colonists were becoming *antagonistic.*
b. This is a *survey,* not a diagnostic test.

Inference: We classify context clues as **inference** if the author does not use any signal words to indicate that the term is being explained. The meaning of the term also is not directly stated in the sentence.

a. With the *Writs of Assistance,* the British now had the right to search any colonist's personal belongings at any time without the colonist's consent.
b. Triangles ABC and DEF are *congruent.* Imagine fitting triangle ABC exactly into triangle DEF so that the sides and angles fit.

Exhibit 6.6

Science Vocabulary Context

Science Example

The walking catfish has a long, eel-like body and a large flattened head with eight long, thin *barbels.* It uses the barbels to feel its way around the bottom of the murky ponds where it makes its *habitation.* In its large head is a series of air sacs which remind scientists of a maze, or *labyrinth;* therefore this complicated network of air sacs is called the labyrinthines organ. This organ permits the fish to gulp air and use the oxygen in it while wiggling overland from one pond to another. The fish moves mostly at night so the sun cannot dehydrate its skin. Therefore, the fish can live out of water for many hours and can survive in waters with a low oxygen content.

Copy the underlined words in your journal, and write brief definitions of the words from context. Then read your journal entries to your laboratory partner. After your discussion, revise your journal entries.

Exhibit 6.7

English Vocabulary Context

Instruct students to skim through their reading assignment and write down any unfamiliar words they encounter. Remind them to attend to headings, italics, bold print, and visual information. Have students also record the page and paragraph containing the unfamiliar word. These lists can be turned in to the teacher or a committee of students. The one(s) in charge compile a master list of words, along with their location in the text. Students then use context to complete the exercise. After completing the definitions, they may choose partners and evaluate their definitions.

Vocabulary	Definition	page	paragraph
tear		279	4
orator		280	7

Exhibit 6.8

Social Studies Vocabulary Context

Follow the steps in Exhibit 6.7, but have students first come up with hypotheses about what the words might mean. Students then read or skim the selection to determine the validity of their predictions. Instruct them to write down any contextual clues which helped them define the word.

Word	Page Paragraph	Predict	Definition from Context	Contextual Clues
annexed	pg. 284 4			
discrimination	pg. 281 7			

Exhibit 6.9

Eights Steps for Learning New Vocabulary

Step 1. Find a new word in your reading.
Step 2. Write down the sentence where you find the word.
Step 3. Underline the word.
Step 4. Write down what you think the word means from context.
Step 5. Find the appropriate meaning of the word from the dictionary.
Step 6. Write a sentence of your own using the word.
Step 7. Write a synonym.
Step 8. Write an antonym.

Exhibit 6.10

Vocabulary Filing System

Print the following format on 5 × 7″ cards which students use to record information about new vocabulary. They then keep these cards in their own personal files.

A Word-a-Day Guide

Sentence: ____

____

Meaning from context: ____

____

Dictionary meaning: ____

Original sentence: ____

Synonym: ____________________ Antonym: ____________________

Part 3: Writing Activities

Writing activities are an excellent way to teach and reinforce vocabulary. If students use words in their own writing, it is very likely that the words will become part of the student's own language.

Two very effective approaches are the vocabulary journal and capsule vocabulary, both of which incorporate talking, listening, writing, and reading. The additional strategies presented here (sentence synthesis, sentence expansion, and framed paragraphs) are part of the Individualized Language Arts Project, a nationally validated project from Weehawken, New Jersey (Alder, 1973). We have used all of these techniques successfully to teach vocabulary as well as to improve students' writing across the content areas.

Strategy 1: Vocabulary Journals

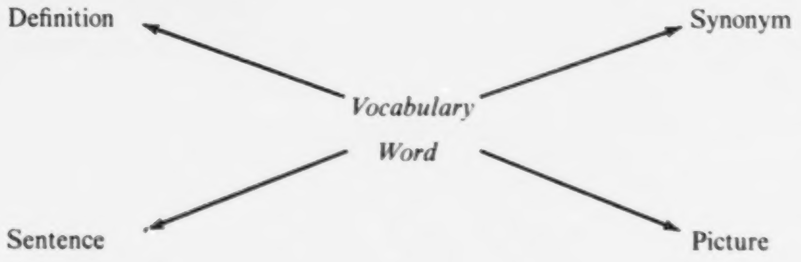
One important dimension of the content journal (see Chapter 5, part 2) is vocabulary development. Many of the activities described in this chapter, such as word maps, sentence synthesis, and "word-a-day guides," can be incorporated into a **vocabulary journal.** Spiral notebooks purchased by each student provide an excellent place for journal entries.

Direct Instruction

1. Model how you use your journal to explain a familiar concept. Review the characteristics of a definition (refer to word map-strategy 1): What is it? What is it like? What are some examples? If the concept is a *dog*, then the answer would be an *animal*. In answering the question "What is it like," you might include details describing a dog that would differentiate it from other animals: it is a mammal; has four legs; can be kept in the house. In the final boxes, the examples might be Lassie, Benji, Old Yeller.
2. Use this information to model writing an explanation in your journal. For example: A dog is an animal. It is a mammal with four legs and is often gentle enough to be kept in a house. Some examples of animals are Lassie, Benji, and Old Yeller. Encourage students to add additional information to the explanation.
3. When you do the next model, follow the same procedure, defining a less familiar concept.

Guided Practice

1. Before students read, have them list in their journals key vocabulary taken from headings and bold print. Have them brainstorm in their journals what they know about the word, using the questions "What is it?" "What is it like?" and "What are some examples?" as a guide. After completing the reading, have the students include additional information in their journals.
2. Have students read their journal entries to one another.
3. Encourage the use of pictures, diagrams, and flow charts to clarify explanations. For example, a simple format which works well as a journal entry is the following:



Instruct students to place the word in the center of the page. Tell them to surround the word with the following information: (1) the definition (in their own words), (2) synonym, (3) a picture illustrating the word or a statement relating the word to the student's background, (4) an original sentence containing the word.

Strategy 2: Capsule Vocabulary

Vocabulary is truly learned when it can be used naturally in speaking, listening, and writing. **Capsule vocabulary** (Crist, 1975) is a powerful learning activity because students must use new vocabulary in their conversation. Capsule vocabulary employs four steps: talking, listening, writing, and reading.

Direct Instruction

1. Select ten to fifteen words which relate to a single topic or concept.
2. Begin discussing the topic with the class. In the discussion, include the new words in sentences. After introducing each word, write it on the board.
3. During the next third of the period, organize the students into pairs. They should hold a conversation using as many of the words as they can. Each student keeps track of the words his or her partner uses.
4. The last part of the period, each student writes a summary or brief paper on the topic, using the new vocabulary words.
5. Students read one another's papers and decide if the vocabulary words have been used appropriately.

Guided Practice

1. Use the capsule strategy as a review of key vocabulary for a test.
2. After students have read an assignment, have them list one or two key concepts from the reading and then the new vocabulary related to the concept. Follow through with the steps outlined above.

Strategy 3: Sentence Synthesis

In **sentence synthesis** activities, students combine new words into original sentences and paragraphs. Sentence synthesis is usually used to reinforce new vocabulary. Students must have some familiarity with the words in order to use the words successfully in their writing.

Direct Instruction

1. List from 3 to 5 words on the board.
2. Review the words in a class discussion.
3. On the board, write one or two sentences using the words. Model how you employ context clues in your sentences.

Guided Practice

1. List 3 to 5 vocabulary words.
2. Have the students review the meanings of words through class discussion.
3. Instruct students to combine words into one or two sentences.
4. Have students write sentences on the board and/or share orally. Exhibit 6.11 presents sentence synthesis exercises from various content areas.
5. Use sentence synthesis to help students review learning guides.
6. Instead of having students write sentences for spelling words, have them include all of the words in one or two sentences.
7. After students have read their assignments, give them four or five words from the selection and have them write a paragraph or summary sentence. Share these in class. We have found this to be an excellent review procedure.

Exhibit 6.11

Sentence Synthesis Examples

Biology

As a review, students were asked to use the following words in one or more sentences to summarize the meaning of the selection: *stamens, pistils, pollen, botanist, seeds*

According to *botanists, stamens* produce *pollen* which is transferred to the tips of the *pistils* where *seeds* develop.

Mathematics

Write a mathematics problem using the following words: *interest, principle, time, rate*. Include numerical values for each as well as the vocabulary words.

> Ellen invested money at 5% *rate* of *interest*. If her total *interest* for a period of *time* of one year was $20.00, what was the *principle?*

Literature

From the words below, choose those that describe the character, Petronella. Explain your choice, by writing sentences like this:

> Petronella was . . . because. . . .

Student Examples:

1. Petronella wasn't *obstinate* because she finally gave up the prince for the enchanter.
2. She was *pertinacious* to start her journey when her parents told her not to.

History

Write one or two paragraphs using the terms below. Organize them in chronological order. Also include contextual clues within the sentence so that these terms are clearly explained.

> Terms: *executive, Federalist, 3/5 ratio, slaves, Articles of Confederation, states rights, judicial, two houses.*

Each student completed the assignment. Then worked in pairs, edited and combined their papers into one final draft. (The teacher only had one-half the usual number of papers to read)

Strategy 4: Sentence Expansion

Expansion is a procedure for helping students expand and reinforce new vocabulary.

Direct Instruction

1. Write a simple sentence summarizing a concept such as "Plants photosynthesize." (See Exhibit 6.12)
2. In class discussion, brainstorm words which answer the questions what, when, why, and how. List all the answers on the board.

Exhibit 6.12

Sample Science Sentence Expansion Exercise

Original sentence: Plants photosynthesize.

Brainstormed ideas:

What kind?	green, trees, flowering plants, grass
When?	daytime, summer, when sun is out, some parts don't require sun, in artificial light
Where?	chloroplasts, leaves, chlorophyll
What is necessary?	sun light, water, carbon dioxide, temperature
What is formed?	glucose, oxygen
Why?	to change light energy to chemical energy

Student example:

Trees and flowering plants photosynthesize in the daytime. The chlorophyll in the chloroplasts located in the leaves combines with light, water, and carbon dioxide to form glucose and oxygen. The end result is that light energy is changed into chemical energy.

Guided Practice

1. After writing a summary sentence covering a key concept on the board, have students work in groups or on their own to brainstorm appropriate categories such as *who, what, when, where, how,* and *why.* Allow students to use class notes and reading material to research the topic.
2. Students expand original sentence to include many of the brainstormed ideas.
3. Students share their writings in editing groups and with the class. Exhibits 6.13 and 6.14 present sample exercises.

Exhibit 6.13

English Sentence Expansion

An English teacher may use expansion for teaching parts of speech. For example, in the sentence below the teacher could ask students to brainstorm nouns, adjectives, adverbs, and clauses to replace or describe the noun *eggs:*

a. Original sentence: There were two eggs on my plate.
b. Students worked in groups and expanded for nouns, adjectives, and adverbs.
c. Student examples:

  1. They were staring at me with piercing yellow eyes and oozing helplessly over the plate. The yolks were quivering spasmodically, threatening to break through the tenuous membrane holding them captive.

     The whites are translucent, slimy suction cups clinging to the plate like a child hanging on his mother's leg the first day of school.

  2. Two eyes balefully stare at my already greenish face. I poke them with my fork, breaking the thin film holding half-solid goo together.

Exhibit 6.14

Fourth Grade English Sentence Expansion

Play a game with overused words, e.g., "said." Have students supply words they could use instead of "said." Divide class into groups. The group that comes up with the greatest number of words is the winner. Put all of the words on a chart so students can use them in their writing.

Example List From a Fourth Grade Class

asked
exclaimed
replied
muttered
yelled
explained
groaned
whined
wailed
whispered
cried
growled
boasted
threatened
moaned
sighed
giggled

snorted
continued
laughed
yawned
smiled
screamed
called
screeched
comforted
squealed
gulped
chuckled
gasped
requested
answered
pleaded

questioned
guessed
begged
grunted
suggested
promised
demanded
grumbled
mumbled
complained
begged
commanded
murmured
refused
decided

Strategy 5: Framed Paragraphs

For an explanation of **framed paragraphs,** see Chapter 5, Part 2: Strategy 2. Exhibit 6.15 presents several framed paragraphs designed to reinforce new vocabulary.

Exhibit 6.15

Sample Framed Paragraphs

Science Content Area

Directions: Summarize Mendel's contribution to genetics. Include the following vocabulary terms: Traits, hybrid offspring, F1 generation, F2 generation. Use the following frame to guide your writing. Feel free to deviate from the frame as you wish.

> Mendel contributed to our knowledge of genetics by. . . . He did this by. . . . He also. . . . Finally. . . . His experiments involved. . . . He first. . . . Then he. . . . From his experiments he formulated. . . .

Student Example

Mendel contributed to our knowledge of genetics by being the first biologist to do clear experimentations on heredity. He did this by limiting his studies to single characteristics. He also used identical matings. Finally, he applied the mathematics of probability to his results.

His experiments involved garden peas having a variety of *traits* (seed shape, pod shape, color). He first crossed two plants having different traits to produce first generation *offspring* called the *hybrid* generation. These hybrids were also labeled the *F1 generation.* Next, he allowed the F1 hybrids to mate to produce a second generation, which he called the *F2 generation.* At every step, Mendel examined the results and from this basic experimentation was able to formulate hereditary laws.

Science Content Area

Framed paragraphs can be successfully used for helping students define vocabulary words. This technique is presented in the following example, which focuses on the concept of microorganisms.

Microorganisms

> Living things that are . . . are called microorganisms. Anton Van Leeuwenhoek first. . . . He thought they were . . . but actually some are . . . and some are. . . . Scientists classify microorganisms. . . . Microorganisms can be . . . or they can be. . . .

Part 4: Structural Analysis

One of the key techniques in studying words is **structural analysis,** in which one breaks them into their component parts. Once the meanings of the individual parts are known, the meanings can be synthesized into the meaning of the word as a whole. Roots, prefixes, and suffixes are the component parts of all words. Thus, instruction in structural analysis should contain these components: (1) an understanding of the meaning of prefixes and suffixes; (2) an understanding of the meaning of common roots.

As content teachers, the best approach to structural analysis is to determine which vocabulary in your content area contains similar structural patterns (common prefixes, suffixes, and roots). Then, group words for instruction according to common patterns. For example, a science book might contain the following words: *chlorine, chloroplasts* and *chlorophyta*. Obviously, the meaning of the prefix *chloro-* would be useful to teach.

Exhibits 6.16 and 6.17 contain a list of the most common prefixes and suffixes, along with definitions. Use this as a resource for helping your students analyze common patterns found in your content vocabulary.

Summary

In this chapter, we stressed various ways to help students learn content vocabulary. We began by discussing the importance of content vocabulary and an overview of a generic approach to teaching. This included activating student background and energetically involving students in procedures which enable them to learn new concepts independently.

We divided the strategies into four main categories: word maps and charts, contextual awareness, writing, and structural analysis. Several of the approaches, particularly those in Part 1 (word maps and charts) and Part 3 (writing), promote an in-depth understanding of concepts. Word maps, semantic feature analysis, vocabulary journals, and capsule vocabulary are designed to promote a thorough understanding of concepts.

Other approaches, such as those described in the contextual awareness and structural analysis sections, focus on interpreting contextual relationships and word structure, rather than on teaching the deeper understanding of the meanings of words. Nonetheless, an understanding of word structure and the author's craft in developing meaning through context are essential tools for students' independent vocabulary development.

In the end, we want students to be flexible. We want them to become competent in a variety of procedures so they intuitively know the best approach for a particular learning situation.

Exhibit 6.16

Definitions of Prefixes

Quality and Condition

1.	a-, an-	not, without
2.	anti-	in opposition to
3.	contra- contro- counter-	opposed to
4.	dis-	not
5.	en-	good, well
6.	heter(o)-	other, different
7.	hom(o)-	same
8.	hyper-	excessive
9.	hypo-	less than, under
10.	mal-	bad, evil
11.	in- ig- il- im- ir-	not
12.	macro-	large, great
13.	micro-	small, minute
14.	mis-	bad, wrong, hatred
15.	non-	not
16.	pseud(o)-	false, untrue
17.	super-	surpassing
18.	syn- sly- sym-	in agreement with, together

Time and Position

1.	ad- ac- af- ag- al- an- ap- ar- as- at-	to, toward
2.	ab-	from, from off
3.	ante-	before, in front of
4.	apo-	away from, off
5.	cata-	down, downward
6.	circum-	around
7.	com- co- col- con- cor-	with, together with
8.	de-	down, away from, separation
9.	dia-	across, through, between
10.	en- em-	in, into
11.	epi-	on, upon, beside

Exhibit 6.16—*Continued*

12.	ex- e- ec- ef- es-	out, outside
13.	extra- extro-	beyond, outside
14.	in- il- im- ir-	in, into, within, toward
15.	inter- intro- intra-	between, inside, within
16.	ob- oc- op-	toward, facing, against
17.	para-	alongside
18.	peri-	around
19.	post-	after, later
20.	pre-	before, in front of
21.	pro-	forward, ahead of
22.	re- retro-	back, again, backward
23.	se-	away, apart from
24.	trans-	across, through, over

Number and Amount

1.	bi-	two, twice
2.	demi- hemi- semi-	half, partly
3.	di- du-	two
4.	kilo- milli-	thousand
5.	mon(o)- uni-	one
6.	multi- poly-	many
7.	tri-	three

Exhibit 6.17

Definitions of Suffixes

Verb

1.	-ize -ise	subject to, render, treat or combine with, to practice or carry on.
2.	-fy -efy -ify	make, form into, practice
3.	-ate	combine, treat with, cause to be, make

Adverb

1.	-ly	manner, degree
2.	-ward	in the direction (sometimes this ending occurs in nouns)

Adjective

1.	-able -ible -ble	capable or worthy of
2.	-al -ial	belonging to, pertaining to
3.	-an -ian	indicating, belonging to
4.	-ary -ory	place for, pertaining to, connected with
5.	-esque	like something, in manner or style
6.	-ful	full of, characterized by, able to, tending to
7.	-ious -ous -ose	state or quality, possessing the qualities of
8.	-ish	of the nature of, belonging to
9.	-ive	expresses tendency or function
10.	-less	without, not having, free from, beyond the range of (also occurs in nouns)
11.	-like	similar
12.	-oid	in the shape of
13.	-some	having the quality of

CHAPTER 7

Directed Reading Thinking Activity (DRTA)

Directed Reading Thinking Activity (DRTA) is a general instructional model for teaching that integrates the various strategies in this text into a logical instructional flow. Basically, a DRTA involves everything the reader does before, during, and after reading to learn content information. As with other approaches in this text, instruction follows from direct instruction to independent application, as the teacher gradually releases responsibility to the student.

This chapter begins with a general description of the Directed Reading Thinking Activity. Exhibits presenting specific examples from science, social studies, language arts, and mathematics complete the chapter.

Part 1: General Description

DRTA involves five steps: preparation for reading, previewing and purpose-setting, guided silent reading, discussion and rereading, and extension activities.

Step 1

Preparation for Reading

Before giving a reading assignment, show the students how to skim the reading selection to determine if there are vocabulary or abstract ideas which are unfamiliar. With this information, have your students explore their own backgrounds to determine if they have sufficient knowledge to understand the passage information.

1. Investigate and expand background knowledge related to the upcoming reading assignment.
    a. Through group discussion and questions, write ideas on the board or overhead what students know about the topic.
    b. Pre-teach any information that students don't know; provide them with an adequate understanding of upcoming information.
    c. Arouse student interest by making the topic relevant to their lives.
2. Introduce vocabulary pertinent to the selection.
    a. Brainstorm meanings of new words.
    b. Give students specific definitions of words not defined through context.
    c. Teach unfamiliar vocabulary through contextual settings.
    d. Analyze the structure of new words to aid in word recognition (roots, prefixes, suffixes).

Step 2

Previewing and Purpose-Setting

Previewing and purpose-setting focuses the reader's attention on specific content outcomes. Before reading, the student previews the assignment and predicts what information will be gained from reading. The student then reads the selection with these goals in mind. At first, the teacher directly demonstrates how to preview the assignment and establish purposes, but gradually turns this responsibility over to the students as they become more proficient in setting their own purposes for reading.

1. Use the text's organization to predict the selection's content.
    a. Discuss the title.
    b. Examine introductions, chapter topics, and summary statements.
    c. Note and discuss study aids: italicized words, vocabulary lists, and summaries.

2. After pre-reading activities, students predict what the material is going to be about and generate several purpose questions for guiding their silent reading.

Step 3

Guided Silent Reading

With their predictions and purposes in mind, students read the assignment silently.

1. See the procedures outlined in the chapters on the Main Idea (Chapter 4) and Learning and Writing Guides (Chapter 5). Many of these strategies are appropriate for silent reading.
2. Consider using reading guides, conceptual mapping, free response, and one-sentence summaries as procedures for helping students become actively involved in their reading.

Step 4

Discussion and Rereading

Focus discussion initially around students' purposes and predictions. Allow students to share whether or not their purposes and predictions matched the author's message. Encourage self-questioning as a way to self-monitor comprehension, and discuss strategies that students can use to improve comprehension.

Note: Round-robin oral reading, in which students take turns reading through the selection, is an ineffective learning strategy and an ineffective use of study time. Not only is it difficult for students to learn from listening to one another read, but round-robin reading fosters student passivity. Instead, teach active reading and writing strategies that involve all your students.

1. Discuss purpose questions and predictions formed in step 2.
2. Discuss how students' conceptions about the selection's purposes changed as they read the assignment.
3. Have students create their own questions and lead a discussion.
4. Use reciprocal teaching, in which students or a committee of students take turns being teacher.
5. As a class, selectively underline a selection. Discuss and reread the material to support underlining decisions.

Step 5

Following Up the Information

Extension activities help students work with and expand upon information gained in their reading assignments. Any activity providing the student with an opportunity to incorporate new ideas with their background knowledge is a worthwhile extension activity.

1. Create learning guides and conceptual maps.
2. Complete problem-solution, opinion/proof, and spool papers.
3. Write paragraph and sentence summaries.
4. Complete RAFT assignments.

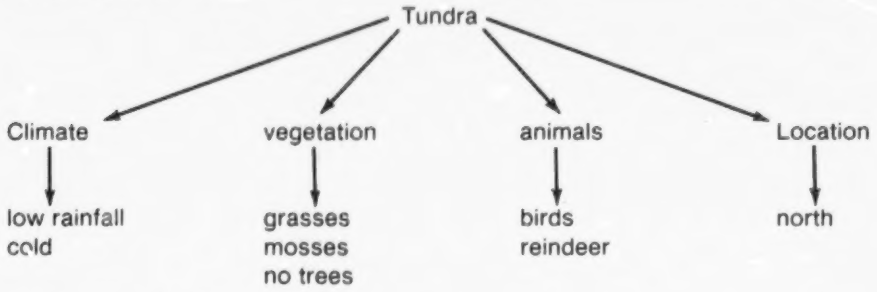
Exhibit 7.1

Science DRA

Reading Selection: "Biomes Determined by Radiant Energy Supply" (See following pages from *Biological Science, An Ecological Approach*, pages 810–814.)

Preparation for Reading

1. Introduce the concept, biome. List the different biomes. For each biome assign students to make a prereading map where they fill in what they already know about the climate, vegetation, animals and location. After they have completed their maps, lead a discussion focusing on what they already know about each biome.



Purpose Setting and Guided Silent Reading

1. Students read the selection to fill in information on their pre-reading maps.
2. While they are reading, the students will also select vocabulary words important to the meaning of the selection.

Discussion and Rereading

1. Divide students into groups. Have each group prepare a large conceptual map of one biome explaining the climate, vegetation, animals and location.
2. Each group then presents the information on their map to the class. The class generates questions about each biome for further research.

Follow Up the Information

1. Each group conducts research in the library to answer the questions generated during class discussion.
2. Each group is then responsible for summarizing the information from their maps and from their library research in a written report.
3. Students could also write a RAFT assignment. For example, they might be an animal living in one biome writing letter to an animal in another biome inviting that animal to change biomes. In the letter they include all the characteristics of the biome.
4. Another option would be thesis/proof notes. If students had any choice of location to live, which biome would they choose? Have them develop their argument using an opinion/proof guide. Then they present their defense through a persuasive paragraph. An example of an opinion/proof guide follows:

Opinion	Proof
My favorite biome is the taiga	1. lakes, ponds 2. spectacular mountains 3. change of seasons 4. not as populated with people 5. hunt wildlife: moose, caribou, bear

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Biomes Determined by Radiant Energy Supply

Guidepost: How does the vegetation change from north to south?

22.2 Tundra Is Characterized by Low Vegetation

The **tundra** (TUN druh) biome circles the earth in the northern hemisphere, just south of the ice-covered polar seas. No tundra is found in the southern hemisphere. Can you explain why? A look at the map in figure 22.4 might help.

In the tundra biome the sun is always low in the sky and little radiant energy is received at any given time. In summer, however, the total radiant energy is great because the days are very long—up to 24 hours above the Arctic Circle. The top layer of soil thaws, but the ground beneath, the **permafrost,** always remains frozen. Melting snow cannot drain into permafrost, so water collects on the surface and in the top layers of soil, as can be seen in figure 22.5. For six to eight weeks the tundra is a land of ponds and marshes, even though the yearly precipitation is small. In this short growing season, plants must synthesize a whole year's food supply. The soils of the tundra are poorly developed and contain very little nitrogen. Microbial decomposition is slow because of the cold temperatures.

Grasses and sedges dominate the tundra. Great areas also are covered by low mats of lichens and mosses. The few woody plants, such as willows (figure 22.6) and birches, grow close to the ground. They seldom become more than a few centimeters tall. Leaves of most plants are small. Many are hairy or have margins rolled inward, thus reducing evaporation of water from the leaf surface. Flowers appear rapidly and seeds develop quickly.

During summer, the tundra teems with animal life. Large flocks of migratory water birds raise their young in the long days that allow around-the-clock food gathering. There are few species of insects in the tundra, but huge numbers of individuals in each species. Great swarms of mosquitoes feed on the caribou, causing them to seek refuge in rivers, only to be plagued again when they leave the water. Caribou graze on grasses and the lichen called "reindeer moss." Ptarmigan, arctic foxes, and snowshoe hares are present in their brown summer coats. Lemmings abound, and when their population is high, predators, such as the snowy owls and the stoat, or ermine, are numerous. Dramatic population cycles, like the one shown in figure 22.8, are common on the tundra because of the harsh climate and variable food supply.

Change from summer to winter is rapid. Lakes and ponds freeze, and the shallower ponds freeze all the way to the bottom. Snowfall is light, only 25 to 30 cm per year, and high winds sweep open areas free of snow. Daylight hours are few, and above the Arctic Circle after the winter solstice there are three months of near darkness.

In the cold and darkness food is scarce. The migratory birds have flown south and some fly deep into the southern hemisphere. Among mammals the chief migrants are caribou, which move south to the forests. Some animals, such as gulls and foxes, migrate to the seashores. When a polar bear kills a seal and has eaten what it needs, the gulls and foxes become scavengers, feeding on the remains. Some animals stay in the tundra all year. Invertebrate animals become dormant or die.

Lemmings avoid the windswept bare ground and burrow under the snow in sheltered spots. There they eat plant roots or seeds they have stored during the summer. Ptarmigan feed on buds of plants that stick

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out above the shallow snow. Though their feathers provide good insulation, they burrow into the snow during storms. Only musk-oxen face winter's full force. Living on lichens, they seek out uncovered plants or paw away at the snow to uncover the plant material.

22.3 Taiga Is a Coniferous Forest Containing Many Lakes

In the southern reaches of the tundra, scattered groups of dwarf trees appear in sheltered places. Eventually tundra gives way to the great coniferous forest, or **taiga** (TY guh). This forest extends in a broad zone across Europe, Asia, and North America, and it includes many ponds and lakes. There is no similar biome in the southern hemisphere.

Because it is closer to the equator than the tundra, the taiga receives more radiant energy, both daily and annually. Summer days are shorter than those in the tundra, but they are warmer and the ground thaws completely. Winters are not as long as they are on the tundra, although the snow is deeper. Under cover of the trees, snow is not easily blown away, and is kept from melting by the dense shade.

Most coniferous trees are evergreen; they lose their needles a few at a time rather than all at once as broadleaf trees do during the autumn or the dry season. Spruce and fir are the dominant species of trees in the taiga. Throughout the year conifers keep out sunlight, so only mosses, lichens, and a few shrubs can grow near the ground. Most food production, therefore, takes place in the upper parts of trees. Many insects attack the conifers, and a large number of small birds eat the insects. Porcupines eat the tree bark, and deer browse the young leaves.

The soil tends to be very acid under the coniferous trees and supports few decomposers. Earthworms are uncommon, but large numbers of very small arthropods live in the soil and decompose organic matter.

Until 10,000 to 20,000 years ago, most of this region was covered by a continental ice sheet. Grinding its way slowly across the continents, the ice dug out depressions. As the ice melted, it left piles of dirt and rocks that often formed dams across streams. Many of the ponds and lakes characteristic of taiga were created this way. Today, moose wade into the ponds to eat aquatic vegetation.

During the winter many animals become dormant, or **hibernate.** As winter approaches, they find shelter and their body processes slow down. The energy needed to keep them alive while they are hibernating is derived from the body fat stored during the warmer months. Many other animals migrate southward. The large feet of hares and lynxes serve as snowshoes. Deer and moose wade through the snow on their long legs, browsing on buds and twigs of the trees. Caribou paw away the snow to get at the lichens that form their diet.

22.4 Mid-latitude Deciduous Forest Biomes Have Four Distinct Seasons

South of the coniferous forest are trees with broad leaves rather than needles. These trees are **deciduous** (dee SID joo us)—they shed their leaves each autumn. The shedding is caused by a decrease in three factors: temperature, available soil water, and light. Deciduous trees are common in eastern North America. This biome is not continuous, and in many states much of the forest has been cut and replaced with farmland. Deciduous forest also is found in western Europe and eastern Asia. In the southern hemisphere a similar small forest occurs in southern Chile.

Exhibit 7.2

Social Studies DRA (Grade 4)

Reading Selection: "Wood, Trees and Forests"

Preparation for Reading

1. From group discussion and questioning, write down ideas that students already know about the topic on the board or overhead. For example, generate a discussion on lumber-related jobs, such as truck drivers, carpenters, Forest Service employees, or lumbermen. Ask questions relevant to the topic: "How many of you have ever hiked in the forest?" "What do you see when you hike?" "How many here have ever been to a lumber mill?"
2. Preteach any information that students do not know, to provide them with an adequate understanding of upcoming information. Introduce information such as the different types of forests and trees. Show pictures of two different kinds of forests (refer to pictures in the text).
3. Arouse student interest by making the subject relevant. An example: Have students describe the logging trucks they see, if they live in a logging area; discuss where lumber is sent and what is done with it once it reaches its destination.
4. Brainstorm meanings of new words. Write the meanings and ideas on the board, such as *timber, wood, boards, planks.*
5. Teach unfamiliar vocabulary through contextual settings. Use the vocabulary words in sentences, and look within the paragraphs of the story. An example: "Trees are a valuable natural resource. What is a natural resource?" Generate the response: something useful to people and supplied by nature.
6. Analyze the structure of new words to aid in word recognition. The word *evergreen* breaks down into *ever green,* indicating this tree stays green.

Previewing and Purpose-Setting

1. Discuss the title "Wood, Trees and Forests."
2. Discuss the introduction, chapter topics, and the summary statements.
3. Note and discuss study aids: italicized words, vocabulary lists, and summaries.
4. Before reading the entire selection, have the students predict what the main point of the selection will be. This statement can be written on the board for further reference.
5. Write other predictions on the board. Since the section is about wood, trees, and forests, what questions do you have that the selection might answer?

Guided Silent Reading

1. Assign the selection to be read. (Do not replace silent reading with round-robin reading.)
2. If possible, have students selectively underline main points and supportive details.
3. Have the students write down vocabulary words that are new to them.

Discussion and Rereading

1. Review the predictions that the students generated at the introduction to the selection. Read the parts of the story which support the predictions. Cross out those predictions not found in the text.
2. Review the vocabulary. Discuss words on student lists.
3. Have students share their underlining strategies on the overhead.
4. Create two-column notes together on the overhead.

Follow-Up Activities

1. As a class, create "right there," "think and search," "author and you," and "on your own questions." Have students take turns being teacher and leading a discussion. Students reread to support answers.
2. RAFT assignment
   Role: You are a coniferous tree.
   Audience: Broadleaf trees.
   Format: A conversation.
   Topic: Explaining how you are different from one another.

Wood, Trees, and Forests

VOCABULARY

forest
natural resource
timber
lumber
deciduous
broadleaf
coniferous
evergreen
natural environment

A long, long boardwalk Can you guess how much wood we use each year in the United States? If we were to make a boardwalk one inch (2½ cm) thick and 30 feet (9 m) wide with the wood we use every year, how far do you think it would reach?

It would reach all the way to the moon! That is a lot of wood. We use wood to build houses. We use wood to make furniture and paper. We even use wood to make such things as camera film, medicine, and thread.

All this wood comes from **forests.** Have you ever been in a forest? A forest is a large area covered with trees. Among the trees are bushes, vines, and other plants. It is shady beneath the trees, and the air is fresh. Birds, animals, and insects make their homes in the forest.

Trees are a valuable **natural resource.** A natural resource is something useful to people and supplied by nature. Trees that are to be cut and used for wood are often called **timber.** After the trees are cut down, the pieces into which they are first shaped are known as **lumber.**

Different kinds of forests Forests in America are not all alike. Some have trees that shed their leaves every year. Such trees are called **deciduous** (di sij′ ü əs). Deciduous trees lose their leaves in the fall. Then in the spring they grow new leaves. The leaves of deciduous trees are usually broad, so they are also called **broadleaf** trees. Two kinds of deciduous trees are maple and oak. Can you name others?

Some forests have trees that do not shed their leaves. The leaves are not broad but are like needles. These trees are called **coniferous** (kə nif′ ər əs) because they bear cones. Since these trees stay green all year round, they are also called **evergreen** trees.

From THE WORLD AND ITS PEOPLE, STATES AND REGIONS by Kaltsounis. Silver Burdett Co., 1984. Pages 32, 34, 35. Reprinted with permission of the publisher.

Among the coniferous trees are spruce and fir. Small ones are often used as Christmas trees.

Coniferous forests are not the only forests that can be called evergreen. In some parts of the world there are broadleaf forests that stay green all the time. Their trees are called broadleaf evergreens. There are very few places in the United States where broadleaf evergreens grow. To find out where these places are, look at the map on page 35. In the next chapter you will learn about one of the states where broadleaf evergreens are found.

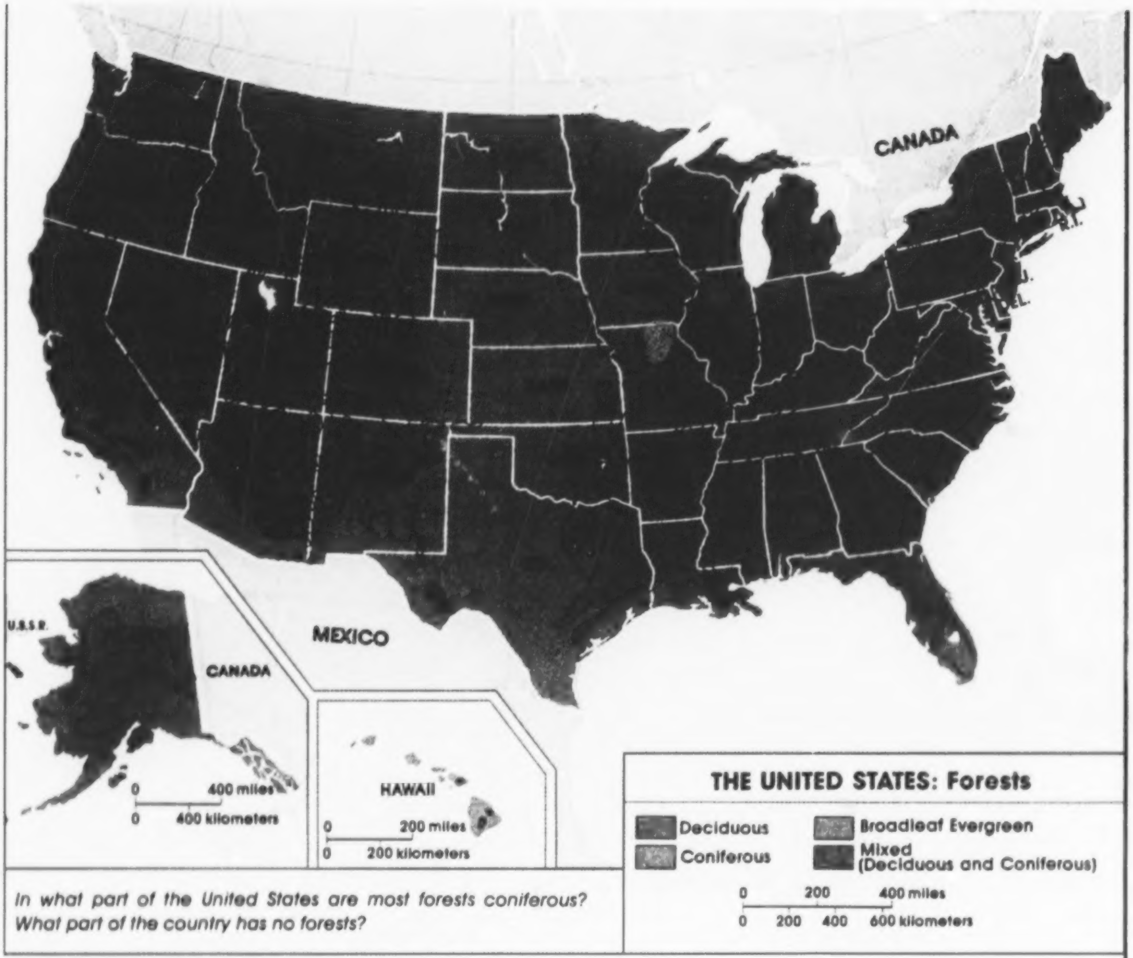
America's forests Great forests once covered most of America. In the warmer parts of the country were huge deciduous forests. In the colder parts were big coniferous forests. In between, there were mixed forests of broadleaf and evergreen.

The first white settlers cut down many trees. They built their homes of wood and cleared fields for farming. They used wood as fuel for heating their houses and for cooking. As people moved west more trees were cut. Forests were destroyed to make farmland and to make room for highways and railroads.

But there are still many forests today. One third of the United States is covered with forests. The map on page 35 shows you in what states those forests are located.

Are there forests near where you live? If so, what kind are they?

The forests of Washington One of the places where there are still big forests is the state of Washington. Look again at the map of the United States, and find the state of Washington. On what ocean is the coast of Washington? What country is just to the north of Washington?


CANADA
U.S.S.R.
CANADA
MEXICO
HAWAII
R.I.
N.J.
DEL.
0 400 miles
0 400 kilometers
0 200 miles
0 200 kilometers
THE UNITED STATES: Forests
▨ Deciduous
▨ Coniferous
▨ Broadleaf Evergreen
▨ Mixed (Deciduous and Coniferous)
0 200 400 miles
0 200 400 600 kilometers

In what part of the United States are most forests coniferous? What part of the country has no forests?

Have students pick out their state. Ask: Are there forests in our state? If so, what kind are they?

On the map you will see that a huge area of trees starts in northern California. It goes through Oregon and Washington and on through Canada all the way to Alaska, our most northern state. Washington is almost in the middle of this great wooded region along the Pacific coast.

Forests cover more than half of Washington State. Most of the trees that grow there are coniferous. Among them are fir, hemlock, spruce, and cedar.

Why does Washington have more forests than most other states? To answer that question, we must look to its **natural environment**—that is, its land, air, water, plants, and animals.

CHECKUP

1. What is a forest like?
2. What is the difference between deciduous and coniferous forests?
3. What other name is used for deciduous? For coniferous?
4. How did the coming of the first white settlers to America change the forests?

Exhibit 7.3

English DRA

Reading Selection: "Old Horse"

Goals

1. To create enjoyment in reading the selection.
2. To become aware of character development within a story.

Preparation for Reading

Discuss the following with the class.

1. Have you ever been called any nicknames? What do nicknames indicate about people? How do you feel when someone calls you a name you do not like?
2. Do you know what the word "sarcastic" means? Do you know anyone who is sarcastic? How do they talk and act?
3. How does someone act who is "patient"?
4. How does a "brazen" person act?
5. Think of a favorite teacher you have had. What do you remember about this teacher?
6. Do you remember a class which was difficult for you? Why was it difficult?

Previewing and Purpose-Setting

1. Read the first two paragraphs of the story. What is your initial impression of Old Horse? Would you want him for a teacher?
2. Today's story is about an algebra teacher given the nickname "Old Horse." Why do you think the students call their teacher "Old Horse"?
3. The story is also about two boys, Jenkins and Rabbit. What do you think the name "Rabbit" suggests about the boy?

Guided Silent Reading

1. Before the students read the entire story, have them write the following questions to be considered as they read:
   a. What do you think the story is about?
   b. Would you or would you not like Old Horse for a teacher? Why?
   c. Would you like Rabbit and/or Jenkins for friends or classmates? Why?
   d. Why do you think Old Horse treated Rabbit the way he did?
2. Direct students to read the story and write responses in the story margins or their journals as they read.
3. Direct students to respond to italicized words. How do these words relate to the characters?

Discussion and Rereading

1. On the board (or in small groups) list the students' comments about each of the characters in the story.
2. Apply each vocabulary word to the character it describes.
3. Discuss the following (students should support their opinions by referring to evidence found in the story):
   a. What did you think about Old Horse at the beginning of the story? Did your opinion change? If so, why?
   b. Would you have liked either Rabbit or Jenkins as a classmate? Friend? Why?
   c. Why do you think Old Horse treated Rabbit the way he did?
   d. What do you think this story is really about?

Follow-Up Activities

1. Choose one character in the story. Using information from group lists and discussion, write a paragraph about that character. Your opinion about the character should be the topic sentence.
2. RAFT Assignment:
   Role: Rabbit
   Audience: Old Horse
   Format: Letter
   Topic: As a 30-year-old mathematics professor, write a thank-you letter to Old Horse.

Old Horse*

Old Horse was the algebra instructor at the school where I teach. I don't remember his real name any more. But he had a long face with big, square teeth, and so the students called him Old Horse.

Perhaps they would have liked him more if he hadn't been so *sarcastic.* With his cutting remarks Old Horse could force the *most brazen student* to stare at the floor in silence. Even the faculty had a healthy respect for his sharp tongue.

One day a boy named Jenkins flared back at Old Horse, "But I don't understand this," Jenkins said, pointing to a part of a problem on the board.

"I'm doing the best I can considering the material I have to work with," said Old Horse.

"You're trying to make a jackass out of me," said Jenkins, his face turning red.

"But, Jenkins, you make it so easy for me," said Old Horse—and Jenkins eyes retreated to the floor.

Old Horse retired shortly after I came. Something went wrong with his liver or stomach, and so he left. No one heard from him again.

One day, however, not too long before Old Horse left, a new boy came to school. *Because he had buck teeth and a hare lip, everybody called him Rabbit.* No one seemed to like Rabbit much either. Most of the time he stood by himself chewing his fingernails.

Since Rabbit came to school in the middle of October, he had make up work to do in algebra every day after school. *Old Horse was surprisingly patient during these sessions.* He would explain anything Rabbit asked. Rabbit, in turn always did his homework. In fact, he came early to class, if he could manage it. Then after the lesson he would walk with Old Horse to the parking lot.

One Friday because of a faculty meeting Old Horse didn't meet with Rabbit. This afternoon I walked with Old Horse. We were passing the athletic field when suddenly he stopped and pointed. "What's the matter with that one?" he asked. He was referring to Rabbit, standing alone chewing his fingernails while watching some boys pass a football.

"What do you mean?" I asked.

"Why doesn't he play ball too?" Old Horse demanded.

"Oh, you know how it is. He came in later than the others, and besides—"

"Besides what?"

"Well, he's different you know? He'll fit in sooner or later."

"No, no, no. That won't do. They mustn't leave him out like that."

Then he had to break off the conversation because Rabbit had hurried over to join us. With a smile he walked beside his teacher, asking him questions.

Suddenly one of the boys from the athletic field called out, "Yea, Old Horse! Yea, Old Horse!" and then he threw back his head and went, "Wheeeeeeee!" like a horse's whinny.

Rabbit's face reddened with embarrassment, Old Horse tossed his head but said nothing.

The next day the students from my fifth hour class came to my room awfully excited. *Old Horse had gone too far, they said, he ought to be fired.* When I asked what had happened, they said he had picked on Rabbit. He had called on Rabbit first thing and deliberately made him look ridiculous.

Apparently Rabbit had gone to the board with confidence. But when he began to put down some numbers, Old Horse said they looked like animal tracks in snow. Everyone snickered, and Rabbit got nervous.

Then Old Horse taunted him for a mistake in arithmetic. "No, no, no. Can't you multiply now? Even a rabbit can do that."

Everyone laughed, although they were surprised. They thought Rabbit was Old Horse's pet. By now Rabbit was so mixed up he just stood there, chewing his fingernails.

"Don't nibble!" Old Horse shouted. "Those are your fingers, boy not carrots!"

At that Rabbit took his seat without being told and put his red face in his hands. But the class wasn't laughing anymore. They were silent with anger at Old Horse.

I went in to see Old Horse after my last class. I found him looking out the window.

**Old Horse* by Oliver Andresen was printed in *Luther Life* (November 1959) and reprinted in *How to Read a Book*, by Eileen E. Sargent (Newark, DE: International Reading Association, 1970). Reprinted with permission of the author.

"Now listen her—", I began, but he waved me into silence.

"Now, now, now, look at that, see?" He pointed to Rabbit, walking to the athletic field with one of the boys who complained about how mean Old Horse had been.

"Doesn't he have a special class with you now?" I asked after a moment.

"He doesn't need that class anymore," said Old Horse.

That afternoon I walked with Old Horse to the parking lot. He was in one of his impatient moods, and so I didn't try to say much. Suddenly from the players on the athletic field a wild chorus broke out, "Yea, Old Horse! Yea, Old Horse!" *And then Rabbit who was with them, stretched his long neck and screamed "Wheeeeeeee".*

Old Horse tossed his head as if a large black fly were bothering him. But he said nothing.

Exhibit 7.4

Mathematics DRA

Reading Selection: "Quadrilaterals," *Geometry,* by Harold Jacobs, pages 290–328.

Teaching Goals

1. Make good use of students' existing knowledge (schema) of quadrilaterals.
2. Develop familiarity with theorems, definitions, and postulates of quadrilaterals.
3. Have students create reading guides to promote their own reading comprehension.

Preparation for Reading

1. Before reading sections of the chapter on quadrilaterals, the students were instructed to make careful drawings with a straightedge of the following figures:
   a. scalene quadrilateral
   b. parallelogram
   c. rectangle
   d. square
   e. trapezoid and isosceles trapezoid
   f. kite

   Students were told to use a single sheet of paper for each drawing (see sample student packet).
2. Students then made a list of the properties of each of the figures.
3. Under each figure, students were told to decide which of their listed properties led to the definition of the particular quadrilateral.
4. Students were told to pay particular attention to the diagonals.

Previewing and Purpose-Setting

1. After completing the above tasks, students read the appropriate section of the chapter.
2. When the students finished reading, they noted that the lesson titles in the reading were the same as in the figures in their drawings.

Purposeful Silent Reading

1. Read the lesson to compare your own definitions, theorems, and postulates with those offered in the text.
2. Students then labeled the properties in their student booklets as being theorems, postulates, or definitions.
3. In addition, students added to the booklet new facts that they had encountered as they read.

Discussion and Rereading

1. A group discussion followed, in which students compared facts presented in their text with those they had recorded on their papers.

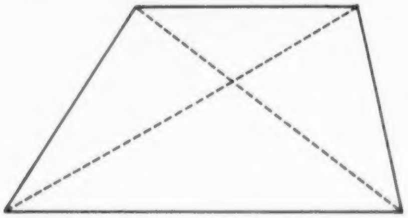
Follow-Up Activities

1. Students did problem sets from the text for each subsection.
2. After completing the above sequence for each quadrilateral, students were given a quiz. For the quiz, they drew selected quadrilaterals, labeled them, and either listed or showed each property for that particular quadrilateral, using the appropriate geometrical symbols i.e., ≅, ∥, etc. Students used such properties as:
   a. equal angles, sides, diagonals
   b. perpendicular parts
   c. supplementary
   d. bisections
   e. right angles, etc.

Sample Student Packet

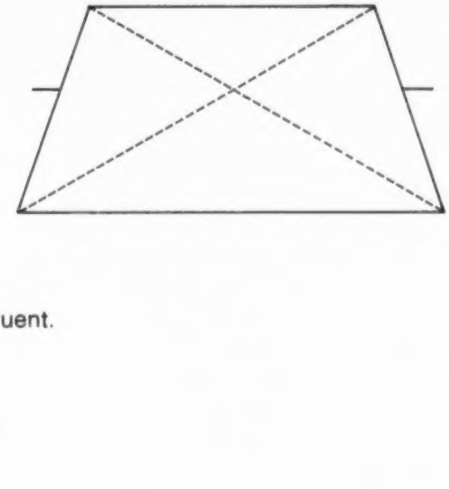
TRAPEZOID

Quadrilateral has exactly one pair of parallel sides.



Properties:
a. one pair of parallel sides.

ISOSCELES TRAPEZOID



Properties:
a. one pair of parallel sides.
b. non-parallel sides are congruent.
c. diagonals are congruent.

Theorem 46
d. Base angles are congruent.

Summary

The Directed Reading Thinking Activity is an instructional framework. We constantly make decisions about how to best teach our content. For each major unit of study we ask ourselves questions: What do I want my students to learn in this unit? How can I help them learn key information? What do I need to teach directly, and what information can I expect my students to learn without direct supervision? What studying and writing behaviors are most appropriate for learning this information?

The answers to these questions become key components of the directed reading/thinking activity, which encompasses everything we and our students do before, during, and after reading to promote learning. All of the strategic behaviors described in this text fit within this overall plan. We have presented you a menu of instructional strategies which you and your students can slot into this generic framework. Choice of behaviors depends upon the materials, instructional goals, student abilities, and personal preferences.

In the beginning we are more directive both about choosing and demonstrating the most appropriate strategies for each stage of Directed Reading Thinking Activities. Once our students are competent in a variety of approaches, we begin stepping aside. We feel pride when our students approach the same lesson with different reading, writing, and studying strategies. Some may prefer two-column notes, others may write explanations in their journals, while still others may create a conceptual map.

Our demonstrating, encouraging, and cheering has empowered our students with choices. In the end, it is the student who plays the game as we applaud and encourage from the sidelines. Successful teachers make themselves progressively unnecessary. After all, isn't that what education is about?

Glossary

active learning A process whereby students do activities before, during, and after reading, such as creating learning guides, underlining, selecting and writing down key vocabulary, or writing.

background knowledge The amount of information students already know about a topic or reading assignment.

capsule vocabulary An active procedure for learning new vocabulary through talking, listening, writing, and reading.

cloze assessment A technique for determining if students can effectively read a selection. After leaving the first paragraph intact, every fifth word is deleted. The students must fill in the missing words while reading. The cloze procedure is also used to reinforce new vocabulary. When used for instruction, words are deleted where appropriate rather than every fifth word.

comprehensive monitoring Good comprehenders self-evaluate how well they understand while they read. If comprehension is not proceeding well, they have strategies for going back and improving their comprehension. This process of self-monitoring is called *metacognition*.

conceptual mapping An active procedure in which students graphically represent the main ideas and details of a reading selection. Typically, students work in small groups with large sheets of paper and colored markers. Maps are used for prewriting and oral presentations as well.

content journal Content journals provide students opportunities to write informally about content. Students use journals to explain new concepts, summarize key ideas, ask questions and for learning where writing seems appropriate. The primary audience is the student.

contextual analysis Strategies which students use to understand new words from the author's written context. Typically this involves the analysis of the contextual clues within a selection.

contextual clues The ways in which authors use pictures and written definitions to develop new vocabulary. These clues vary from exact definitions of words within a reading selection to more difficult, indirect definitions which students must infer.

contrast definition A new term is explained by what the term does not mean.

direct definition The author provides a definition of the new term within the text.

direct instruction The teacher takes responsibility for directly teaching students how to do learning strategies by modeling and talking about how to implement the strategy. Once students understand, the teacher guides the students in using the strategy on their own.

directed reading/thinking activity (DRTA) A general approach for helping students learn across the curriculum. The DRA includes all of the activities before, during and after reading which promote learning of the information.

example definition The author defines a new term through examples.

framed paragraphs A very structured approach to writing, in which the teacher provides written clues about the main idea and the transitions within the paragraph. Students fill in the material necessary to write their paragraphs.

free-response, or read-and-respond As students read, they write down any comment which comes to mind. These comments may be questions, one- or two-word comments, as well as sentences. The procedure is designed to help students become more actively involved in their reading.

front loading A three-step method for preparing students to read: drawing out from the students the information necessary to understand a selection, supplementing where necessary, and, finally, providing a purpose for reading.

guided practice This process is employed after direct instruction. The teacher works with the students through a new procedure, providing assistance when needed.

inference definition The meaning of a new term is not directly stated. The reader must deduce meaning indirectly.

informal learning inventory A procedure for determining if students can learn from an assigned text. A test is constructed over a reading assignment to evaluate reading comprehension, study skills, and writing.

learning guides Note-taking procedures used for organizing information. Learning guides described in the CRISS materials are the Montana Plan and variations, problem-solution, and thesis-proof.

metacognition See comprehension monitoring.

modeling After introducing a new strategy to the students, the teacher demonstrates how he/she would do it, explaining to the students the thought process involved and the end result.

mystery pot A reading selection is typed, sentence by sentence; cut apart, and put in envelopes. The students work together to organize the sentences into a well-written selection.

opinion/proof A reading and writing guide in which students state an opinion or conclusion, then provide evidence to support their opinions or conclusions.

power thinking A procedure for helping students differentiate main ideas (power 1) and details (power 2, 3, and 4).

previewing A strategy which involves scanning the material and noting headings, pictures, diagrams, highlighted vocabulary, etc. Then one predicts what the selection will be about.

problem-solution A reading and pre-writing guide in which students organize information into four categories: problem, effects of the problem, causes of the problem, and solutions.

purpose-setting A procedure in which the teacher guides the students in predicting what the selection might be about. Then the students generate questions which will guide them as they read.

question-answer-relationships (QAR) A system for classifying questions which students use for generating their own questions from text.

R.A.F.T. A procedure for giving writing assignments which specifies the role of the writer, the audience, the format, and topic of the assignment.

read-and-respond See free response.

readability formulas Procedures for finding the grade level of materials. The criteria are sentence length and word complexity as determined by the number of syllables in a word. If readability formulas are used to assess text difficulty, they should never be used alone, but in conjunction with other measures which examine the structure and organization of text.

reciprocal teaching An active approach to reading comprehension, in which the teacher first models a questioning strategy, then gradually turns the questioning over to the students. Students take turns questioning, with the teacher and the other students providing constructive feedback. This active approach to comprehension has produced dramatic improvements in students' reading comprehension.

rereading As used in the context of this program, only portions of a selection need to be reread in order to patch up comprehension. It is not intended that the student reread the entire selection.

restatement definition Definitions which contain clue words (such as, that is, in other words) which indicate that a term is being defined.

semantic feature analysis (SFA) A procedure which fosters the understanding of relationships among the key vocabulary and concepts in a selection.

semantic map A system for organizing main ideas and details into a hierarchical array.

sentence expansion A vocabulary and paragraphing procedure in which students expand a sentence by brainstorming who, where, what, when, how, and why words. Brainstormed words are listed on the board and then used for rewriting the original sentence or for paragraphing.

selective underlining A procedure in which only key words and phrases are underlined. Students are encouraged to number main ideas *1, 2, 3*. . . . , and letter supporting information or details *a, b, c*.

sentence synthesis Students combine new vocabulary into one or two sentences.

signal words Clue words (first, second, in summary) which help the reader understand the author's organization of ideas.

spool paper A five-paragraph paper which begins with a thesis paragraph, followed by three paragraphs which develop the three points specified in the thesis. The fifth paragraph is a conclusion.

story grammars Story grammars characterize the general structure of stories by defining what most have in common.

story mapping Diagrams of story components such as character, setting and plot.

structural analysis Students learn to figure out new vocabulary by analyzing the words according to roots, prefixes, and suffixes.

structural overviews Key ideas or vocabulary in a reading selection are organized hierarchically, depicting the relationships among ideas.

study guides See learning guides.

study skill inventory A questionnaire which assesses student studying behaviors.

study skills Those methods a student uses in order to learn, such as notetaking, underlining, self-questioning, memorization, rereading, etc.

textbook inventory A teacher-created survey of the text. Students use this tool to locate the key features of the book, such as glossary, index, vocabulary development, use of illustrations, etc.

thesis paragraph A paragraph which begins with a general statement or opinion followed by two or three sentences which support or prove the first sentence. It is the first paragraph of a spool system paper.

think-alouds A procedure for direct instruction. The teacher demonstrates how he/she does a particular reading or writing strategy. During the demonstration the teacher talks about the thinking processes he/she is using.

transition words Those words used to signal the reader about what is next in the selection, such as "additional information," "further," "too," "but," "on the other hand," "thus," "therefore."

vocabulary journal A journal where students record and write about content vocabulary.

two-column guide Students put main ideas in the left column and details in the right. The left column information is used for self-testing.

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